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THE

ELECTRICAL REVIEW

LONDON: HAUGHTON & COMPANY, 10, PATERNOSTER ROW, E.C.
NEW YORK: D. VAN NOSTRAND, 23, Murray Street, and 27, Warren Street. PARIS: M. [illegible], 39, Quai de l'Horloge;
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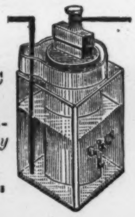

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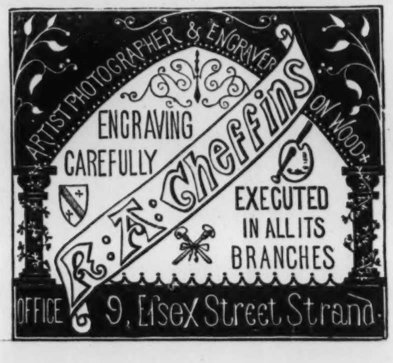

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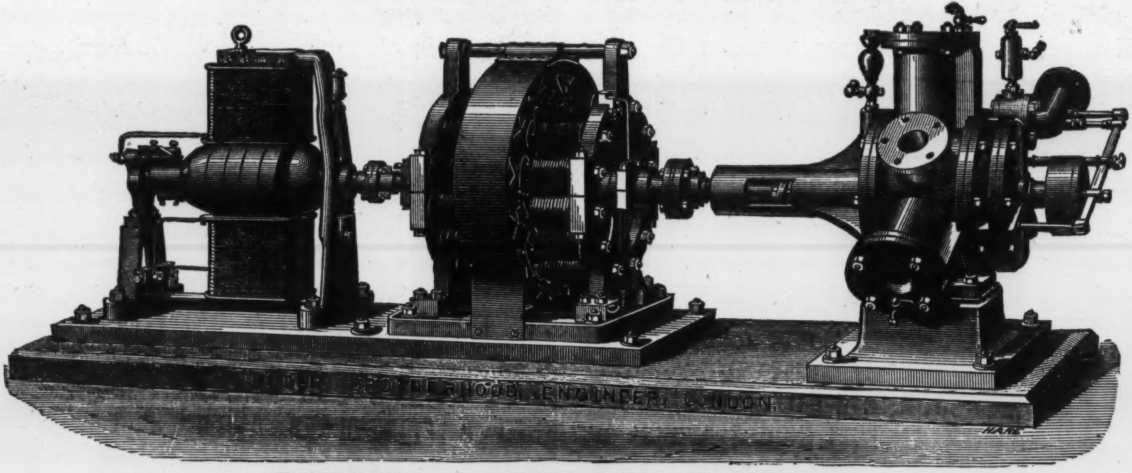
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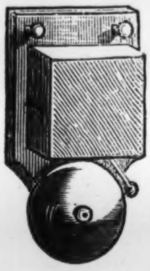

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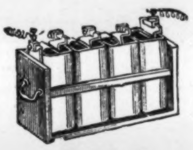

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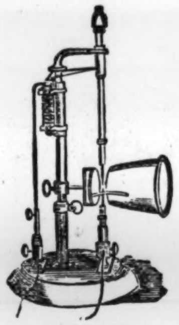

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Further particulars may be obtained from Mr. PHILIP A. LATHAM, Secretary, at the Offices of the Company, 110, Cannon Street, E.C.

THE TELEGRAPHIC JOURNAL AND

Electrical Review.

VOL. XI.—NO. 243.

THE POSTMASTER-GENERAL AND THE TELEPHONE.

ON Monday evening in the House of Commons Mr. Fawcett, the Postmaster-General, was asked by Mr. Cross whether he had arrived at a decision as to the applications made by various companies for licences to establish and work telephonic exchanges? Mr. Fawcett's reply will be welcomed by all concerned in the future development of this partially stagnant enterprise, for he has decided to favourably entertain proposals that may be made to him by responsible persons to grant new telephone licences under certain conditions, which may be regarded as giving adequate protection to the public and the postal department. We have on many occasions felt compelled to differ from the Post-office authorities in regard to the future efficiency of the public telephonic service, notably in No. 218 of the ELECTRICAL REVIEW. It was scarcely to be expected that the Postmaster-General could long hold out against public opinion even had he been so inclined, so his conclusion that a telephonic monopoly would not be in the interests of the public is what we have all been expecting and patiently waiting for. Competition is as desirable in the case of the telephone as it is with the electric light, and as the former is doubtless destined to be of much greater service to mankind, the extraordinary activity recently shown in pushing forward our new illuminant will probably be surpassed by the interests of telephony.

The recent law-suits in Edinburgh and London have certainly done much to throw the telephonic industry open to all comers, for had it not been for the evidence there brought forth, and the unusual public interest awakened in the matter, the monopolising company might probably have held its sway for some time yet. As it is, Mr. Fawcett's decision will effect such results as he himself will eventually be gratified at seeing. The position of the telephone at present is rather peculiar, for there are doubtless many new inventions which have only been kept back by the action of the Postmaster-General, ready to compete, the moment they are set at liberty, with the only one at present in operation.

It will be remembered that in our issue of the 8th inst. we stated that we had received from reliable authority the statement that the Postmaster-General contemplated giving up the erection of private telephone wires, and that as far as telephone exchanges were concerned the Post-office authorities would not interfere as long as their own interests were not invaded. Our readers will therefore see that at least as far as half our information was involved the result has proved the correctness of our statements. The truth of the remaining part of our note is only probably a question of time. Referring to the erection of lines, Mr. Fawcett said in the House of Commons, "In case it may be supposed that inconvenience may arise from the multiplication of wires, I may remark that the licence of the Postmaster-General to establish a telephone exchange confers no special power whatever to erect poles and wires on, or to place wires under any highway or private property. The persons to whom a licence may be given will have to make their own arrangements with the local authorities and with any persons whose property may be affected. It may be well to add that the licence of the Postmaster-General confers no authority to carry on telephone business with any instrument the use of which would be an infringement of any patent." We should not imagine that telephone companies will find any insurmountable difficulties in regard to the erection of their lines on private property. Private telegraph lines have been put up in very many instances, and we do not anticipate much opposition in this respect to the introduction of the telephone. When the Telegraph Act was brought in and the Government took over the telegraphs, it was never intended that the Post-office authorities should erect private lines, and if they have done so it has been ostensibly for the convenience of their customers and not for the sake of any revenue derived from such a proceeding. It would, therefore, be advisable that the Postmaster-General should not take any further action in putting up private wires, but allow this to be performed by private companies exclusively. It is certainly unfair on the part of the postal authorities to compete in any way with private concerns, as the latter are placed at such an enormous disadvantage owing to the former having the power to put up poles and wires without obtaining the permission of those on whose property they are erected. The matter of patent rights will of course necessarily have to be settled by the competing companies, but what may be used, and what not, is now pretty generally known since Mr. Justice Fry's decision in the trial of the United Telephone Company *v.* Harrison, Cox-Walker & Co.

We said in our article bearing upon this subject, and published in the ELECTRICAL REVIEW of January 28th, that from the standpoint of efficiency to the public service we thought that competition should be allowed, an equal royalty in all cases being required. We also added that if the existing services were good, and if the desirability of intercommunication between one member of a community and any other member of that same body be so apparent, why then competition might fairly be allowed, for it could do but little harm. But if, on the other hand, the service was indifferent, wanting in energy, or the charges immoderate, then competition was the very thing to effect a cure, and therefore whichever way the question was regarded, the then action of the Postmaster-General was as unjust as it was unnecessary. The present action of Mr. Fawcett has, however, now improved the aspect of the whole matter, and the telephonic inventions which might then have been consigned to oblivion, will now have an opportunity of competing with those which have hitherto held the monopoly. When the British and Irish Telephone Company was in correspondence with the secretary of the General Post-office, one of the arguments advanced was that "this company only seeks the privilege of affording the public a far cheaper, and they hope, a better telephonic service by means of exchanges than the associated companies give, in addition to selling the best telephones for private use, which the other companies have agreed not to do."

The result of Mr. Fawcett's deliberations will be that the public will have the advantage of not merely one better system than that at present in use, but of selecting from numerous competing systems that which is best adapted from all points for the various purposes required. The United Telephone Company has never been able to instil much energy into its own movements, and the Post-office, which for awhile seemed to threaten opposition to it, fared, telephonically, still worse. It is therefore a wise proceeding on the part of Mr. Fawcett to allow new blood to come upon the scene and to carry out operations which the above named company and the Department have signally failed to achieve.

The "scientific toy" has now taken a firm stand in the necessities of our every-day life, and bids fair to be the most useful assistant we can ever expect, wherewith to carry on the commonest, or the most momentous business transactions of our daily life.

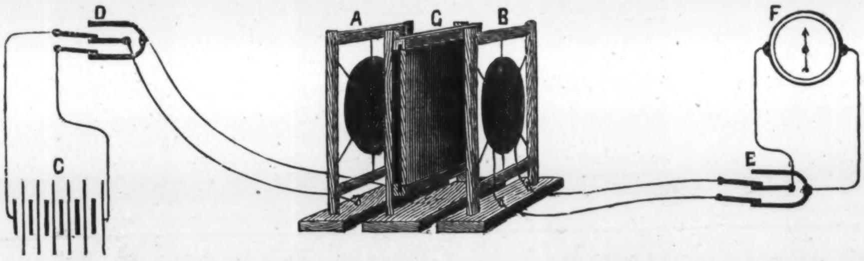
WILLOUGHBY SMITH ON INDUCTION.

In a small pamphlet recently printed Mr. Willoughby Smith has given the results of some interesting experiments which he has recently made on "Induction." The most important of these relate to the measurement of the "specific inductive resistance" of various materials. The meaning of the term specific inductive resistance, in contradistinction to specific inductive capacity, is made clear by the following experiments of the author :—

Two equal lengths of copper wire insulated with gutta-percha were wound side by side upon a wooden reel and immersed in water. The specific inductive capacity of each length was ·084 of a microfarad. Now, to measure the "specific inductive resistance" of the dielectric, the two ends of one of the coils were connected to a galvanometer, and the other coil was then charged to the same potential as when measuring its specific inductive capacity. The deflection on the galvanometer caused by induction from the charge in the other coil was, say = 1. Two precisely similar lengths, and of the same dimensions, but insulated by a dielectric of known high specific inductive capacity, were then tested in the same way, and the following results obtained :—

Specific inductive capacity = ·288 microfarads.
Deflection on galvanometer = ·94 ,,

showing, the galvanometer deflection being less, that there was less inductive effect through the dielectric of high specific inductive capacity, or in other words that the specific inductive resistance was greater. It therefore follows (says the author), that for the dielectric of a long line of telegraph, either submarine or subterranean, where one conductor is alone employed the dielectric of the lowest specific inductive capacity is the most suitable; but where it is desirable to lessen as much as possible induction between parallel wires in close proximity, and of comparatively short lengths, then the dielectric of the highest specific inductive capacity would be the more suitable of the two.



In order to determine the specific inductive resistance of various metals, the author had the apparatus shown by the figure constructed. In this apparatus

A and B are two flat spirals fixed a suitable distance apart. In circuit with A was a battery, C, and reverser, D, and in circuit with B a similar reverser, E, and an astatic mirror reflecting galvanometer, F. The reversers were so arranged that E should reverse slightly in advance of D, and by that means a large and steady deflection was obtained, the galvanometer being always affected in the same direction by the induced currents set up in B. A plate of the substance to be tested was then placed midway between the spirals, as shown at G, and in proportion to the interception of the lines of force so were the deflections on the galvanometer; and thus, by this arrangement, very accurate and sensitive measurements could be made. By this method the following results were obtained, showing the percentage of inductive radiant energy intercepted by plates of metal sixteen inches square and half an inch thick.

Table 1.

	Interception per cent.
Copper	44·1
Tin	3·5
Lead	·4
Zinc	11·9
Steel	55·3
Iron	57·0
Compressed Iron Filings	10·0

It was observed that time was an important element to be taken into account whilst testing the above metals, that is to say, the lines of force took an appreciable time to polarise the particles of the metal placed in their path, after having accomplished which they passed more freely through the same. That being so, the thought naturally occurred, *Would the results be effected by varying the speed of the reversers, so as to increase the number of the lines of force striking the plate under test in a given time?* The results given in the following table clearly show that this surmise was correct; and the knowledge gained opens out another large field for earnest thought and further investigation.

Table 2.

Metal under Test.	Per cent. of Inductive Energy intercepted at various speeds.							Conductivity of the Metal pure Copper = 100.
	Number of Reversals per Minute.						Mean.	
	384.	432.	504.	560.	624.	720.		
Copper . .	44·1	49·6	55·2	59·4	62·1	67·5	56·3	73·0
Brass . .	9·3	11·3	14·7	19·9	23·9	26·5	17·6	20·4
Tin . . .	3·5	7·4	7·4	9·7	11·3	13·1	8·7	17·4
Lead . .	·4	4·0	3·0	2·8	5·0	5·2	3·4	6·4
Zinc . .	11·9	16·1	20·2	23·6	26·0	30·9	21·4	33·3
Steel . .	55·3	56·8	57·6	58·0	59·0	59·8	57·7	11·7
Iron . .	57·0	58·1	57·8	58·4	59·8	60·0	58·5	13·8
Iron Filings .	10·0	—	—	—	—	18·5	14·2	—

It will be noticed by reference to the foregoing table that the percentage of inductive energy intercepted does not increase for different speeds of the reversers, in the same ratio with different metals, the increase with iron being very slight, whilst with tin it is comparatively enormous. The following table gives the percentage of increase for each metal experimented with :—

Table 3.

Metal under Test.	Per cent. of Increase.
Copper	53
Brass	185
Tin	274
Lead	—
Zinc	160
Steel	8·1
Iron	5·3
Iron Filings	42·

Sheets of metal similar to those in the tables, but only 1-8th of an inch thick, in no way intercepted the lines of force.

If for each metal the mean of the results obtained with various speeds (*see* Table 2) be compared with the specific conductivity of the same, it will be seen that in each case the specific inductive resistance is in the same direction as that of their specific conductivity, with the exception of the magnetic metals iron and steel; that is to say, the higher the inductive resistance the higher the conductivity.

When two metals are combined to form an alloy, the resistance of the alloy is in most cases greater than that calculated from the resistance of the component metals and their proportions. The specific inductive resistance of alloys appears to follow in the opposite direction. For example, the percentage of inductive radiant energy intercepted by copper is 56·3, and that of zinc 21·4, but an alloy composed of sixty parts copper and forty parts zinc only intercepted 17·6. The following will further illustrate the subject:—

Composition of Alloy.	Interception per cent.	Calculated.
67 parts Copper 33 ,, Zinc	14·6	45·6
62 ,, Copper 37 ,, Zinc 1 ,, Tin	14·7	43·6

It will also be observed that the increase in the proportions of the metal copper of the highest specific inductive resistance decreases the inductive resistance of the alloy.

Dielectrics, such as gutta-percha, glass, sulphur, and shellac, as well as fluids and gases, have little or no effect in intercepting the lines of force.

The author found that when an intermittent current was sent through a spiral similar to that shown in the figure, then this intermittence was distinctly heard in an ordinary telephone held at some distance from the spiral, that is, so long as the telephone does not lie exactly in the plane of the spiral. It was found that the sounds were even heard when a copper diaphragm was used. If the coil on the magnet were short-circuited the sounds disappeared.

Referring to Table 1, the inefficiency of lead in interrupting the induction is very remarkable, and points to the inutility of employing lead-covered wires in telephone circuits for warding off inductive action between wire and wire. It is also obvious that iron forms the best protector. It would have been interesting if Mr. W. Smith had continued his experiments by making use of an earth, so as to more nearly represent the actual state of affairs in the case of telephone wires.

REVIEW.

Practical Information for Telephonists. By T. D. Lockwood, Electrician, American Bell Telephone Company. New York: W. J. Johnston, 9, Murray Street.

The position which Mr. Lockwood holds as electrician to the American Bell Telephone Company naturally gives authority to his work, and any information which it contains we may be sure will be of a thoroughly practical and useful nature. Works which pretend to be merely handbooks of the subject with which they deal are not usually considered to be of more than an instructive nature; but in the book before us Mr. Lockwood has interwoven in a most natural manner a vein of that humour which is seldom met with except in an American, and the result is that the production is both amusing and instructive, and interests while it teaches. Many of Mr. Lockwood's humorous observations are very much to the point, and contain truths which are often unheeded. We have more than once insisted upon the necessity of the apparatus used for testing purposes being not only suited for the object for which it is employed, but also upon such apparatus being handled in a manner consistent with its nature; with reference to this, we find at the conclusion of a chapter on the "Blake transmitter" the following paragraph: "Finally, my brethren, as in all electrical apparatus, when a transmitter is working well leave it alone, and never forget that when repairs or new adjustment is requisite, the instrument is not a four hundred horse-power Corliss steam engine, but a telephone transmitter."

The first chapter of Mr. Lockwood's book gives a short and well-arranged historical sketch of electricity from the earliest down to the present date. We next have "Facts and Figures about the Speaking Telephone," in which it is stated that the first record of a sound transmiting instrument in connection with which the word "Telephone" occurs, is believed to be the English patent of Sir Charles Wheatstone, No. 2462, October 10th, 1860, in which are described "Telephones in which musical pipes or free tongues are acted upon by wind." We fancy the use of the word telephone as a sound transmitter dates considerably further back than 1860. Indeed, some of our readers may remember the well-known "telephonic" concerts of Sir Charles (then Professor) Wheatstone, given at the now defunct Polytechnic Institution very many years back, in which musical sounds were transmitted a considerable distance through wooden rods. Speaking of Reiss's apparatus, Mr. Lockwood says, "that with this instrument even articulate sounds and words were transmitted, received, and understood by *those who knew beforehand what the words were going to be.* This remark seems to us a very forcible one, and considerably changes the aspect of the statement of which so much has been made, viz., that Reiss's telephone anticipated Bell's, inasmuch as it actually transmitted articulate speech. Mr. Lockwood very truly and humorously states that, "between this telephone and the speaking telephone there was a great gulf as wide as the gulf which, in the parable, separated Dives and Lazarus."

The first telephone line, it appears, was constructed early in 1877, and in May of the same year the first practical telephone exchange was operated.

The construction of telegraph or telephone lines, though dealt with in a few pages, is still dealt with in such a manner as to give a very great amount of useful practical information, small but necessary details (which are so often neglected) being given. Mr. Lockwood in giving information, goes straight to the point at once without introducing his remarks with a quantity of useless matter. All the important elements in connection with telephonic communication are dealt with in separate chapters, and while it is done in an entertaining manner, it is done thoroughly practically, thus any one reading the book carefully, ought to have no difficulty in tracing out and removing such faults as usually occur in the apparatus. The sketch of the telephone inspector as he ought to be as contrasted with what he often is, might be read with profit by many and the model copied with great advantage.

To point out the very many excellent points in Mr. Lockwood's little work (for it is but a small one), would occupy too much space, but we can heartily recommend it to all classes of readers. The only fault we can find with the book is, that it is too short and requires illustrations. We are sure that if Mr. Lockwood enlarges and illustrates his present work, he will earn the thanks of many, especially as one can see that he is a man who knows what he is writing about.

THE BAUDOT TELEGRAPH.

(*Seventh Article.*)

Relay.—It has been explained in describing the combiner that the line current does not act directly on the pointing electro-magnets. These are set in motion by a local current dependent on a relay. The relay employed by M. Baudot is shown in figs. 11 and 12; the armature is placed between two copper notches, fixed on the pole of a horse-shoe magnet. It is maintained in this position by its own weight and by the attraction of the magnet, which imparts to it its magnetism by induction. This armature moves between two coils of an ordinary electro-magnet. The magnet is placed in a wooden case, which supports two copper riders, into each of which is screwed the core of the relay coil. The play of the armature is limited by two contact studs. The relays are regulated in such a manner that when the armature is displaced under the influence of a current of a certain direction, it remains in that position until a current of the opposite direction returns it to its original position. Generally the positive current moves the armature to the *marking* contact, and the negative current moves it to the *spacing* contact. The negative current necessary to do this is supplied by a local battery, one pole of which is connected with that of the brushes of the distributor, which traverses the ring of receiving blocks. We have seen that this brush is about two contacts in advance of the brush connected to line which traverses the same crown, the blocks of which are connected to one end of the coils of the relays. Thus, at each turn of the arm of the distributor a negative current is sent into the coils of all the relays, and restores the armatures displaced at the preceding turn before the line current comes again to set them in action, according to the combination to be formed. Fig. 11 shows the perspective view of five relays;

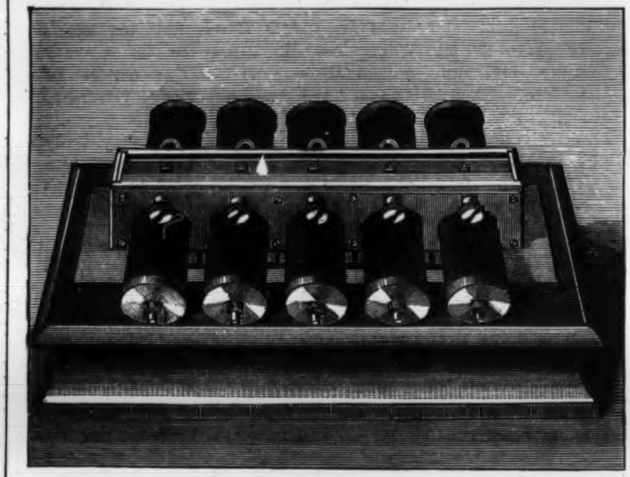


FIG. 11.—QUINTUPLE RELAY.

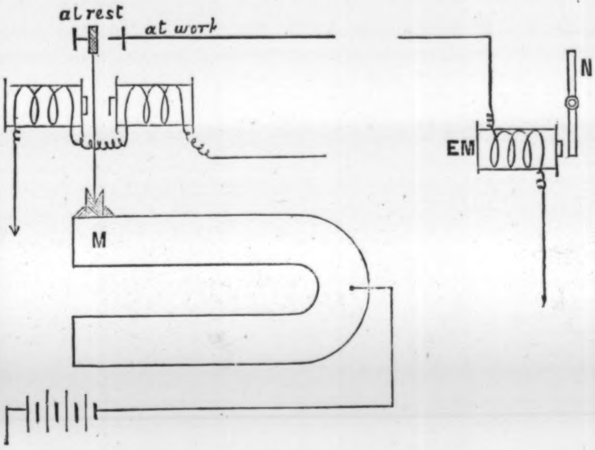


FIG. 12.—DETAIL OF SIMPLE RELAY.

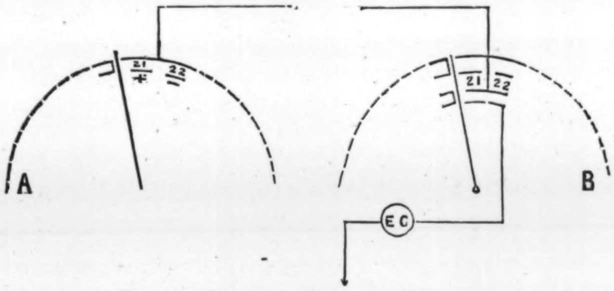


FIG. 13.—CORRECTING SECTOR OF DISTRIBUTOR.

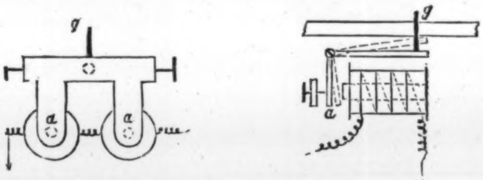


FIG. 14.—CORRECTING ELECTRO-MAGNET.

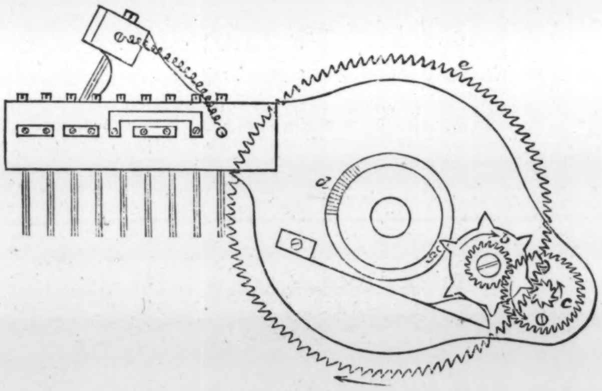


FIG. 15.—CORRECTING MECHANISM.

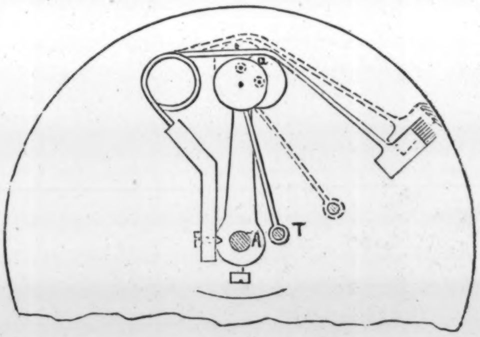


FIG. 17.—REGULATOR BRAKE.

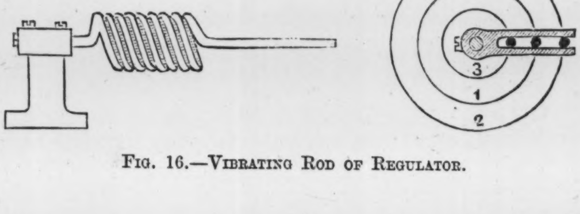


FIG. 16.—VIBRATING ROD OF REGULATOR.

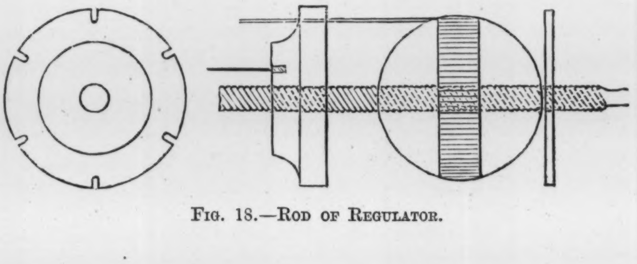


FIG. 18.—ROD OF REGULATOR.

fig. 12 gives details of the relay; the connections indicated on the diagram show how the armature of the pointing electro-magnet follows the movement of the armature of the relay. The pointing electro-magnet is an ordinary one.

Correcting Apparatus.—We are going to complete what we have merely alluded to in the description of the distributor relative to the function of the correcting sector by means of which we arrive at the synchronism of the two distributors at the home and distant stations. Let us imagine a distributor of a quadruple apparatus divided into twenty-two equal contacts; twenty will belong to the four transmitting sectors, and two will serve for correction. We will establish the connections in the manner indicated in fig. 13.

At the station, A (to the left of the diagram), the contact 21, of the second division of the sector of correction, will be connected to the positive pole of a line battery, and the contact 22, of the same division, to the negative pole of a similar battery. These same contacts on the first division being connected to the line, the positive and negative currents will be sent every time the brushes of the distributor establish communication between the two divisions. At the station, B (on the right), the contact 21, of the fourth division, will be put to earth, and the contact 22, of the same division, connected to a relay which will actuate the correcting electro-magnet (fig. 14), and displace the armature, *a*.

The displacement of the armature will raise a pin, *g*, by the movement of the arm of a lever. This pin, dropping into a hole in the distributor, will come in contact with a star-wheel, *b* (fig. 15). This wheel, *b*, has on its circumference six teeth, the intervals between which represent 1-18th of the circumference described by the arm. It is maintained in its position by a cam at the extremity of a flat spring, the other end of which is attached to the frame of the arm. By a pinion, the star-wheel gears into a second-toothed wheel, *c*, also furnished with a pinion which is in connection with the lower wheel of the vertical axle of the arm.

This wheel is put in motion by a bevel wheel fixed to one extremity of the axle of the fly-wheel, it pulls the arm which will turn regularly with it when the correcting apparatus is out of action. But at the moment when the pin, *g*, is raised, the star-wheel stopped by this obstacle will turn on itself in a direction contrary to the general movement, pulling the arm with it. The spring, drawn away during the interval between two teeth, will return of itself in the following interval; there will, therefore, be a delay in the movement of the arm determined by accessory wheels, the number of teeth in which are calculated to correspond to the value of 1-6th of the contact during 1-18th of a revolution. The return of the correcting pin is effected mechanically by means of an eccentric connected to the arm.

Regulator.—In order to correct the effect of sudden variations in the speed of the apparatus a fly-wheel is employed. This is worked by the motor by means of a crown; it constitutes, as we know, a sort of reserve force, which lessens the variations in the speed, but it does not regulate, as it does not insure isochronism.

The regulator, figs. 16, 17, and 18, is similar to that in the Hughes apparatus; it consists of a vibrating rod of steel (fig. 16), slightly tapering in form, and two metres in length. The thicker extremity, coiled into nine spirals, is firmly fixed on a support placed in the prolongation of the axle of the fly-wheel; when the rod is thus brought into an invariable position, its free end rests laterally against the back of the axle of the fly-wheel. It is connected with the movement of this axle by means of a handle consisting of several parts, the whole of which constitutes what we call the brake.

A copper arm is fixed on the back of the axle of the fly-wheel, which it accompanies in its revolutions. The free extremity of this arm is clamped to a cylindrical collet, into which is introduced, with little friction, a small pivot parallel to the axle of the fly-wheel and terminated on the side of the vibrating rod by another arm, bent at its free extremity into the form of a ring.

Into this ring is introduced the free extremity of the vibrating rod. The pivot above mentioned bears on the side of the fly-wheel an excentric cam of ivory, independent of the movement of the rod; on the point, *a*, above this cam, rests a bent spring, as is shown in fig. 17.

On the straight part of the vibrating rod is introduced a solid sphere of copper, which can be moved along the rod to bring it near to, or draw it away from, the extreme end, and thus regulate the speed.—*L'Electricien (M. Ch. Bontemps).*

M. DE MERITENS' NEW MACHINES.

[The following description of these dynamo-electric machines was written for *La Lumière Electrique* by M. Aug. Gueroût.]

DURING the ten years that the ring machines have been in practical use they have been subjected to one improvement after another, and the degree of perfection to which they have now attained justifies us in asserting that the problem of transforming mechanical work into electricity is in a great measure solved.

This first and very important condition being arrived at, dynamo-electric machines still present one considerable difficulty: their price is somewhat too high for industrial applications.

This is partly due to the fact that in purchasing machines the consumer often pays for the patent rights, and partly also to a want of attention to the question of economy in the construction at first. The price being once settled and the catalogues published, scarcely any further consideration was given to the subject. But now when the patents of the principal ring machines are on the point of becoming public property, and when also a careful examination of the Pacinotti machine has proved the worthlessness of some of them, the object of constructors should be to offer their machines at the lowest possible rate, so as to bring them into general use.

Several inventors have already turned their attention to this subject; amongst others we shall speak more particularly at present of M. de Méritens, who with this object has directed all his efforts to the Pacinotti machine.

Since that time, he endeavoured firstly to render the employment of his first machine, designated by the letter C, available for public lectures.

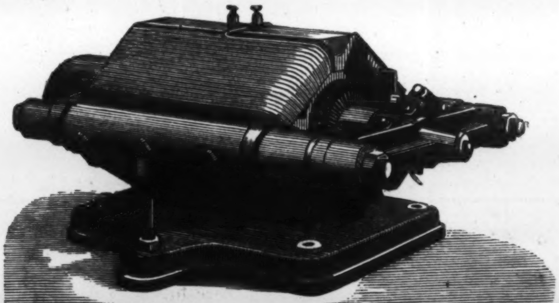


FIG. 1.

In order to do this he added to his model a system of gearing by means of which it could be worked by hand. A large toothed wheel with two handles enables four men to put the machine in motion at the speed required. If, under normal conditions, the work which one man can produce is only six kilogrammes per second, he can after an effort of a few moments arrive at a much higher result. This is why the four men working at the two handles can during a few minutes produce sufficient work to maintain by the machine an electric regulator of 100 Carcel burners. As we see, the light can only be maintained for a very short time, but this period is quite sufficient for purposes of illustration. The professors for whose benefit the apparatus was designed will certainly appreciate a model which enables them to demonstrate practically to their pupils the working of the principal electric lamps, without resorting to motive force or using fifty battery elements. Without making any alteration in the construction of the first machine, M. de Méritens then designed a second type, designated by the letter I. It only differs from the original apparatus in that it is longer and of larger dimensions. This type has a normal speed of 2,800 revolutions, and can at high tension maintain two lights of sixty Carcel burners. (*See* fig. 2.)

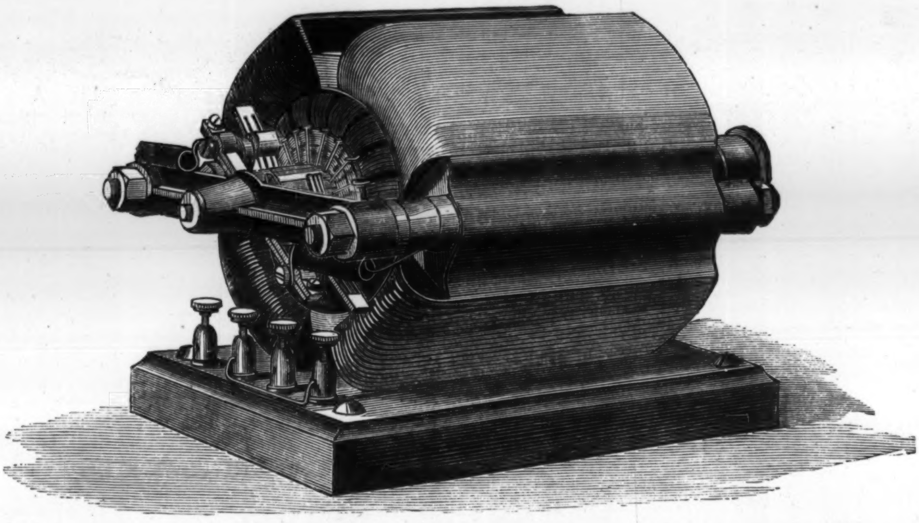


FIG. 2.

The cylindrical form given to the inducing electro-magnets somewhat complicated the construction of the machine. M. de Méritens thought this construction could be simplified by using flat inductors so as to give the machine the form of a straight prism with a rhombic base. The polar radiations lodging naturally in two angles of the space in which the coil is placed, there is thus no appreciable displacement. This idea suggested two types of machines, shown in figs. 1 and 3.

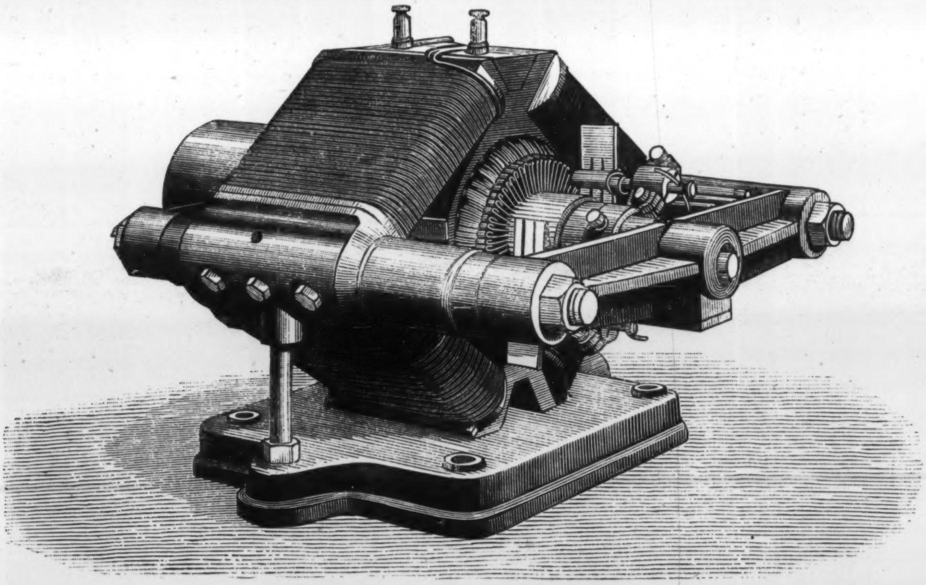


FIG. 3.

The first of these machines is designated by the letter J. It is of comparatively small dimensions, and constructed to maintain a light of 180 Carcel burners. It turns like type I, at 2,800 revolutions, and absorbs 2½ horse-power.

The second machine, or type H, can feed a light of 650 Carcel burners with an expenditure of 4 horse-power, turning at a normal speed of 1,600 revolutions per minute. A similar machine can be used for working powerful lights, such as those used in lighthouses.

The same machine can be used to feed 25 incandescent Swan lamps of two ampères each ; its electromotive force is 80 volts.

The weight of these machines is reduced as far as possible. The first, type C, has been somewhat lightened, and with its present construction weighs only 30 kilogrammes. The type H, which is the most powerful, has a weight of 224 kilogrammes, and the model I weighs only 47 kilogrammes. These weights are, as we see, very moderate in proportion to the power of the machines.

Following the method indicated by M. Marcel Deprez, M. de Méritens studied these different machines, making the external resistances vary progressively.

The accompanying table gives the results obtained with the type C, the inductor and induced coil of which have each a resistance of 1·33 ohm.

Intensity in Ampères.	Electro-motive force in volts.	Resistance in ohms.	Intensity. in Ampères.	Electro-motive force in volts.	Resistance in ohms,
10·69	55·05	3·49	4·50	53·95	9·33
9·66	65·11	4·08	4·14	52·04	9·91
8·97	65·66	4·66	3·96	52·07	10·49
8·28	65·41	5·24	3·70	50·08	11·08
7·59	64·44	5·83	3·45	48·40	11·66
6·90	62·58	6·41	3·17	47·26	12·25
6·55	63·21	6·99	3·11	48·17	12·83
5·86	60·0	7·58	3·10	49·82	13·41
5·35	57·88	8·16	2·80	46·62	13·99
5·0	57·0	8·74			

It must be observed that the resistances given in this table are external resistances, and that in order to obtain the total resistance, the resistance of the machine, amounting to 2·66 ohms, must be added to them.

Intensity in Ampères.	Electro-motive force in volts.	Resistance in ohms.	Intensity in Ampères.	Electro-motive force in volts.	Resistance in ohms.
1·0	15·93	15·16	15·72	57·85	2·91
1·20	17·72	14·0	20·29	62·90	2·33
1·41	19·18	12·83	22·50	63·23	2·04
1·73	21·50	11·66	26·38	66·48	1·75
2·12	23·87	10·49	27·69	65·35	1·59
3·0	30·30	9·33	29·23	64·89	1·45
4·0	35·72	8·16	31·80	65·83	1·30
5·66	43·98	7·0	35·10	67·74	1·16
7·35	48·51	5·83	37·51	67·14	1·02
9·54	51·80	4·66	51·45	69·46	0·58
13·19	56·19	3·49			

The second table gives the results of similar experiments made with the machine H, the resistance of which is 0·76. Summing up the characteristics of these machines with the help of the figures contained in the tables, we arrive at results indicating good conditions of construction. We may add that, in the types I and H the prismatic form offers great facilities of construction. The whole body of the machine may in fact be cast in two parts; the coiling of the wire is easily effected on each part, and it is then only necessary to bring them together in order to constitute the framework of the apparatus, in which we have only to adjust the induced ring.

Before concluding this article, we will indicate one more improvement effected by M. de Méritens, not in dynamo-electric machines, but in carbons for lighting. For powerful lights, such as the lamps for lighthouses, especially in the large lighthouses of England, carbons of very large diameter are used. Now it is very difficult to get these large carbons of the same composition throughout, and besides, the greater part of the time their rate of consumption is not equal. The external parts are naturally more dried up and consume quicker than the central parts. These two circumstances prevent the regular consumption of the carbons and thus affect the steadiness of the light. In order to overcome this difficulty, M. de Méritens conceived the idea of substituting for the large carbons a number of small rods of the same material, each having a diameter of three to four millimetres. These rods are connected together by fastenings of copper wire, and their number is proportionate to the thickness of the cluster employed. Each rod is covered with copper, and so is the whole cluster. In this manner the rods are well held together, and form a whole which may be considered very homogeneous on account of the very slight thickness of the layers of copper deposited by the battery.

These compound carbons give a very steady light, and we notice even that besides the regularity the light obtained is more intense than with rods in one single piece.

We can easily understand that this should be so, since every part of the cluster being consumed equally, disturbing influences are no longer produced in the central parts.

Clusters of this kind, 4 centimetres in diameter, have been tried in the large models of the English Lighthouse Administration, and have produced results in every respect satisfactory, so that the clusters will henceforward replace the old carbons

THE ELECTRIC LIGHTING BILL.

A SPECIAL sitting of the House of Commons was held on Saturday to further consider this Bill.

On the motion to go into committee upon the Bill,

Colonel Makins said that instead of waiting until the third reading before bringing on the motion standing to his name, he had decided, after consulting with the President of the Board of Trade, to mention the matter to-day; but as the forms of the House precluded him from making the motion now, he would content himself with drawing attention to the question. But although he was connected to a great extent with gas companies, he did not on this occasion represent their views. He believed gas companies generally were content with the details of this measure, and looked upon it as a strong and successful attempt to grapple with a difficult question, but they were opposed to it on two points of principle. No legislation on this matter would control or affect the competition between the various systems of electric lighting now in existence, such competition would eventually be decided by efficiency and economy alone. Gas companies were not alarmed by the progress which had been made in electric lighting in the last few years, for not only had gas the advantage of forty years' start and enormous capital, but the progress made in electric lighting was as yet more of a scientific than of a practical nature. As much, or nearly as much, capital had been subscribed towards fifty-five electric lighting companies in the last few weeks as had been expended on gas in the last forty years, namely, £13,000,000 or £14,000,000. But he was afraid that the greater portion of that sum would find its way into the pockets of experimentalists and patentees. The two points he wished the House to consider were, first, the powers taken by the Board of Trade to grant licences to companies and persons to supply electric light, and, secondly, the powers which the Bill proposed to confer on corporations to make experiments without consulting the ratepayers whose money might thus be squandered lavishly. Hitherto the power to grant licences had rested with Parliament, and it was quite a new departure for one department of the State to usurp this power. Then, under section 2 the words "public purposes" had acquired a new meaning, and would include not only streets but churches, vestry-halls, and theatres. He maintained that a theatre could not be called a public place. This power would also enable the local authorities to use the money raised by rates for supplying electric light to private consumers, and he did not think corporations had ever before possessed such a power as that without first having obtained the sources of supply. He also considered it most improper to permit local authorities to have the power of using the money of the ratepayers for what might be termed speculative purposes, more especially as there was nothing in the Bill providing for ratepayers having any control over their representatives. He would, therefore, move, "That it is undesirable to retain in the Bill the novel powers proposed to be given to the Board of Trade to grant licences to local authorities or persons enabling them to exercise powers hitherto only granted by Act of Parliament, or provisional order confirmed by Act of Parliament, and the power given to local authorities under clauses 5 and 6 and other parts of the Bill to raise money on credit of local rates without the consent of the ratepayers, for the purpose of competing with private capital, are contrary to every principle hitherto recognised by the Legislature, and that no Bill containing such powers will be acceptable to this House."

Mr. Carbutt agreed with the hon. member in condemning this new departure in legislation, which might hereafter be applied to railways and entail great loss on shareholders. It was opposed to every principle of political economy, and violated the principle of fair dealing. The public wanted electric lighting, but wished private enterprise to develop it, and then they would come in and buy up the successful undertaking the moment it paid at the price of old material. He protested against such a proposition.

Mr. Slagg argued that the value of undertakings could not be arrived at now, and wished to know why private outside companies were to be encouraged to make enormous profits out of the public without local authorities being possessed of such a power as that proposed by the Bill.

Mr. W. Fowler thought electric lighting companies ought to have at least as long a term as tramway companies, who had twenty-one years. People had gone wild about electric lighting at present, no doubt, but they subscribed their money for speculative purposes thinking they would be able to sell their shares at great profit. The Government was going too far in discouraging private enterprise.

Mr. Chamberlain said the questions raised by the hon. member for South Essex were important. The other questions could be considered in Committee. This Bill had already been exhaustively considered by the Select Committee presided over by the hon. member for Mid-Lincolnshire (Mr. Stanhope). He admitted that the power to grant licences was a new one, but it was founded on the recommendation of the Committee which sat in 1879. The object of the Government was to facilitate experiments in electric lighting, and this method was thought to be more economical than the old method of provisional order. The Board of Trade would hear evidence on both sides before granting a licence to a local authority, and then the licence would be restricted to five years. The question as to the definition of "public purposes" was of little importance. As to the question whether it was justifiable to place public money in competition with private capital without the consent of ratepayers, there were precedents for that; and he considered that corporations were degraded by so much supervision by ratepayers as that conferred by the Borough Funds Act, an Act which he hoped to see amended or repealed altogether.

Mr. Warton protested against this assumption by the Board of Trade of duties which properly belonged to other departments of the Government. It was not in any sense a scientific body, and the president merely desired to magnify his office; and that department ought not to be allowed to trammel the progress of inventors and experimentors, who ought to be allowed to make their own way in the world as others had done before them.

Mr. MacIver said all that was wanted was that electric lighting companies should have fair play, as other companies had. He agreed with the hon. member for Bridport in protesting against the Board of Trade taking upon itself duties which ought to be left to more suitable departments.

Colonel Makins said, after the discussion which had taken place, he would withdraw his amendment.

The amendment having been accordingly withdrawn,

The House went into committee on this Bill.

Clause 1 was agreed to.

On Clause 2 being proposed,

Mr. Warton moved that music-halls should come under the definition of public places.

Mr. Chamberlain said it was immaterial whether music-halls were lighted by public or private licence.

Mr. Warton said it might become important hereafter in regard to enforcing regulations for public safety; but he would withdraw the amendment.

Mr. Carbutt moved that licences should be granted for seven years instead of five.

Mr. Chamberlain said licences were renewable with the consent of local authorities.

Sir John Lubbock asked what would be done if an agreement was made for ten years.

Mr. Chamberlain replied that a licence could only be granted for five years, but an agreement might be made with the local authority to assent to a renewal.

Mr. Serjeant Simon observed that a corporation was a perpetual body, and unless it possessed powers as strong as those to be used under the Bill, no one would enter into agreements with it.

Mr. Shaw hoped the opinion of the local public would be ascertained, as corporations did not always reflect that opinion. If the five years' limit were retained, unless the companies cared to apply for so short a licence, the Bill would probably become a dead letter.

Mr. Chamberlain explained that the Board provided for local inquiries to be held whenever they were desired. With regard to the five years' licence, it was possible to proceed by Provisional Order as well, and if the period of the licence were extended the House would lose the authority it possessed by means of provisional orders.

After some further discussion the amendment was withdrawn.

In reply to Colonel Makins the Attorney-General said there was no limit to the renewals of licences.

Colonel Makins entered a protest against the system of licences, believing they would work injuriously to public interests.

Clause 2 was agreed to.

Clauses 3 and 4 were also agreed to, but on clause 5

Mr. Pugh moved an amendment preventing local authorities incurring the expense of carrying out a scheme for electric lighting, without first obtaining the consent of the ratepayers.

Colonel Makins supported the amendment, but thought its object might be attained by making a preliminary inquiry compulsory.

Mr. Chamberlain said the best security for the honesty of the local authorities was in making them thoroughly responsible, and not in keeping them in leading strings. A local inquiry must take place before a corporation could borrow money, and the Board of Trade would encourage such inquiries.

The amendment was eventually withdrawn and clause 5 was agreed to.

Clauses 6 to 13 having been agreed to,

On clause 14, provision for the protection of the Postmaster-General, and for the purchase of undertakings by local authorities,

Mr. W. N. Nicholson moved an amendment extending the time after which a local authority might require persons who supply electric light within its jurisdiction to sell their undertaking from 15 to 21 years.

Mr. Chamberlain said the period of 15 years was a compromise fixed upon by the select committee between the two periods which had been suggested, and they were of opinion that that time would be sufficient for experiments to be made. The committee had two objects in view: first, not to throw obstructions in the way of companies; and, secondly, to protect the interests of the public from suffering from such monopolies as gas and water companies had obtained. He believed all the electric companies, with the exception of the Edison Company, had expressed their satisfaction at the period fixed. He was of opinion that the time given should be long enough to enable the companies to make satisfactory experiments.

Mr. Carbutt supported the proposal.

Mr. Slagg and Mr. J. Jenkins thought fifteen years sufficient.

Mr. Story-Maskelyne said several companies had informed him that they were satisfied with fifteen years, and—

Mr. W. N. Nicholson withdrew the amendment, being satisfied with assurances that the companies generally were satisfied with the time fixed.

Mr. J. K. Cross moved to introduce the following words in the purchase clause: "With such addition for goodwill as may be agreed upon, or, failing agreement, as may be determined by arbitration, but without any addition for compulsory purchase; and, provided always, that the sum paid shall not exceed by more than 25 per cent. the value ascertained as aforesaid. When a part only of the undertaking is purchased, payment shall be made on the same terms, but with such addition as may be requisite to compensate for loss occasioned by severance."

Mr. Rathbone opposed the amendment, believing that it was antagonistic to the public interest.

Sir John Lubbock asked the President of the Board of Trade to explain the clause.

Mr. Chamberlain said this clause had been drawn up with the intention of insuring that the purchasers should pay the same price as if they bought in the open market. If the local authorities were debarred from purchasing the undertaking at the end of a reasonable term at a reasonable price, they would only have the alternative of setting up in business for themselves; therefore he thought the amendment was against the companies.

Mr. Cross withdrew his amendment.

Clauses 14, 15, 16, 17, 18 and 19 were then added to the Bill.

On clause 20,

Mr. J. Hamilton moved that so far as Ireland was concerned the Local Government Board should be substituted for the Board of Trade.

Mr. Chamberlain said he was willing to take the opinion of Irish members on this point, although he thought it would be better that the management should all be in the hands of one body.

Mr. Stanhope advised that the control for England, Scotland and Ireland should be in the same hands.

The amendment was, however, withdrawn and clause 20 agreed to.

Mr. Barran next moved the following new clause:—"No application for a provisional order on the part of any company or person shall be made in respect of all or any part of the district of a municipal, or other local authority, without six months' notice in writing (which shall define the area intended to be comprised therein) to such authority, who shall, within that period, be entitled to make application for a provisional order in respect of all or any (including the area defined in such notice) of such district; and until such application has been disposed of no other application shall be entertained."

The Hon. Member hoped the committee would see how necessary it was that the supply of electric light should be controlled by the local authorities. In the case of the gas supply to Leeds, the difference between the cost of gas when in the hands of private companies and the corporation was remarkably significant. The companies, which were bought up by the corporation for £800,000 or £900,000, charged from 3s. 6d. to 4s. 6d. per 1,000 cubic feet, but the corporation supplied gas to the city and some outlying districts at 1s. 10d. per 1,000 cubic feet.

Mr. Chamberlain agreed with the principle of the proposed clause, but thought it was not necessary as the Bill contained similar provisions. He could not accept the clause.

Mr. Stanhope said the select committe had discussed the question of notice very exhaustively, and had come to the conclusion that three months were quite long enough for a corporation to make up its mind, and therefore he hoped the new clause would not be accepted.

The committee divided, with the following result:—

For the clause	29
Against	88
Majority ...	59

The clause was rejected, and the schedule having been agreed to, the bill was reported.

CORRESPONDENCE.

TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer, not necessarily for publication, but as a guarantee of good faith.

Correspondence should arrive not later than Tuesday morning if it is desired to appear in the following number.

FIRE RISKS FROM ELECTRIC LIGHTING.

To the Editors of THE ELECTRICAL REVIEW.

SIRS,—Sparks falling from the carbons of an arc lamp are no doubt a source of danger; and the fire insurance offices, in the exercise of their duty, are quite right to turn their serious attention to the subject. There are other fire risks attending the careless use of the electric light of which cognisance must also be taken; but one fails to see the relevancy of a great deal of the gratuitous advice contained in the somewhat fussy "Rules and regulations for the prevention of fire risks arising from electric lighting," which the Council of the Society of Telegraph Engineers and of Electricians have been pleased to issue.

Their first "rule" for the prevention of fire risks is that "the dynamo machine should be fixed in a dry place;" scarcely, it is to be apprehended, because if fixed in a wet place it would be likely to set the wet on fire. But the Council have no doubt their good reasons for considering that fire risk would be increased by dampness of the machine, although they don't state why.

"It should not be exposed to dust or flyings" (whatever the latter may be), is rule 2; and if the nature of dust and "flyings" is to be explosive or combustible, the Council are right in mentioning them as amongst the fire risks. Much the same may be said of many of the other rules.

In the middle of the rules and regulations the Council strongly urge—in three separate paragraphs, one beginning with N.B.—"the employment of safety fuses;" but they do not mention the name of the patentee, nor give his address, in case one may have occasion to communicate with him. One concludes, therefore, that he must be the man in the moon, whose name does not appear on the committee, but who has probably mentally influenced these rules, regulations, and N.B.'s. As I understand the description of these fuses, which "are of the very essence of safety" [beware of fraudulent imitations!], they amount to no more than the old French lightning guard of Breguet, in which a fine iron wire was fused when too much (atmospheric) electricity happened to go through it. But the safety fuse, which is "of the very essence of safety," recommended by the Council, is "constructed of easily fusible metal, which would be melted if the current attain any undue magnitude, and would thus cause the circuit to be broken," and, I conclude, put all the lights out. I cannot help thinking that this fuse, which may be "of the very essence of safety," is not of the very essence of originality, and one cannot be sure whether the united genius of the eighteen gentlemen who are responsible for this indirect, and perhaps unconscious, advertisement, might not be able to suggest something much more refined. But the matter is at least relevant to the subject of fire risks, which is more than can honestly be said for a good many of the rules.

A second N.B. (which by the way has no connection whatever with the rule which precedes it), recommends the frequent testing of the wires. We are told: "It is an operation, skill in which is easily acquired and applied,"—particularly when using certain testing apparatus, invented probably, by the man in the moon; but this is not specified.

The Council then proceed to give a rule and regulation that "the escape of electricity cannot be "detected by the sense of smell," after which effort of originality, we are comforted by the assurance that "it can be detected by apparatus far more certain and delicate;" and it might have been added to this—"portable and guaranteed to be of the best workmanship, and the invention of the man in the moon."

The final rules for the prevention of fire risks are to the effect that wires should be arranged so that no one can be exposed to the shocks of alternate currents exceeding 60 volts, but it is not stated whether this is for fear of the individual being set on fire; and that if the difference of potential within any house exceed (the Council say exceeds) 200 volts the *outside* of the house should be provided with a switch, so arranged that the supply of electricity can be at once cut off—probably in the event of a passing policeman seeing any of the inmates in a state of incandescence at the windows.

It is, at first sight, not quite clear where the Council obtained such exact information regarding the danger point—viz., 60 volts—of alternate current circuits (though why 60 volts in particular rather than 50 or 70, most of us are as ignorant as probably the Council themselves), while they do not say anything about the much higher potential differences found in some of the continuous current systems. It would not be an incorrect statement that the majority of instances in which death has resulted from incautiously touching wires, has been in connection with systems employing continuous currents. Surely the man in the moon cannot have invented a continuous current machine!

In all systems, care has to be taken to keep out of danger, and people will learn to avoid new dangers just as they have learnt to avoid old ones, such as keeping gas streaming into a room for an hour or so before lighting it; or to avoid taking hold with the naked hand of the business-end of a red-hot poker.

The intention of these rules is admirable, but it is doubtful whether the rules themselves are quite up to what we would have expected. There is a strong suspicion of oblique puff in some of the paragraphs, and these are served up amongst a good deal of very common knowledge, and a little grand-motherly twaddle, all which could have been done just as well without the imposing array of eighteen scientific gentlemen, one half at least of whom have had no practical experience whatever in connection with the subject upon which they undertook to legislate. Truly in this case, as in that of the lightning-rod committee, the mountain in labour has brought forth a mouse. Seeing that this effort of intellect has been issued gratis, unlike the report of the lightning-rod committee, which cost 5s., it may be thought, perhaps, a little ungracious not to pass it over in silence; but when the council of an important scientific society, with high aims and serious work before them, go out of their way to prove over again the truth of the old saying, that gratuitous advice is worth just what it costs, one cannot help regretting that their efforts were not devoted to a more useful purpose.

Faithfully yours,

C. E.

THE CRYSTAL PALACE ELECTRICAL EXHIBITION.

To the Editors of THE ELECTRICAL REVIEW.

SIRS,—Will you kindly inform me, through your columns, when the Honorary Council of Advice of the late International Electric Exhibition held at the Crystal Palace are likely to make known the jurors' awards to the exhibitors of the same, as I am informed that the second exhibition of electric appliances will shortly take place, and the forms applying for space should be filled in and returned before August 1st next?

As an exhibitor in the last exhibition I do not feel justified in making application for space until I know the result arrived at by them—whether it be satisfactory to the general body of the exhibitors or not, and in that interest I shall be glad to know the result.

I am, Sirs, yours truly,

July 18*th*, 1882. DISQUE.

THE TELEPHONE.

To the Editors of THE ELECTRICAL REVIEW.

SIRS,—The documents sent you by Mr. Silvanus Thompson, in his letter of the 1st instant, relating to the results obtained by Reiss, are evidently interesting, and I shall endeavour to reproduce them in the next edition of my work on the telephone; but they will scarcely alter my ideas as to the share to be ascribed to Mr. Reiss in the discovery of the *speaking* telephone, for if he did effect the reproduction of speech, he only did so, in my opinion, accidentally, for nowhere does he mention the grand principle of the intervention of undulatory currents, which alone could lead to this remarkable result. For sounds to be reproduced by a receiver consisting of *an iron wire enclosed in a helix and stretched on a sounding case placed on a table* (the only Reiss receiver known), the currents sent by his transmitter must have been *interrupted*, and hence the reproduction of articulate speech *could only have been effected accidentally* when the two contacts were by chance maintained one against the other; and as this contact, when prolonged, would stop the sounds on account of the limited extent of the variations in intensity of the currents with such contacts, only irregular and discontinuous effects could be obtained. If the telephonic receiver had been adapted to be held at the ear speech might have been heard in a more continuous manner; but I have never heard of a Reiss receiver so constructed. However, according to Prof. Dolbear, Reiss had constructed a model with an electro-magnet and an armature. Was it with this receiver that the effects quoted by Mr. Thompson were obtained?

However this may be, it seems probable that if Mr. Reiss had really penetrated the principle of the articulating telephone he would have substituted for the metallic contacts some of moderate conductivity, so as to obtain a greater extent for the variations in intensity of the currents transmitted, and he would, besides, have arranged his telephone to be applied to the ear, if his principal object had not been to reproduce musical sound sufficiently loudly to be heard at a distance, and by several persons at once. The prospectus of which Mr. Thompson speaks proves nothing, for it is very certain that if the problem of *seeing to a distance* is one day solved, it cannot be said that it was effected two years ago, as the American newspapers said that *a means had been discovered of seeing by telegraph*. At this rate it might also be said that Manzetti, of Aosta, also discovered the telephone, for in 1865 a number of journals announced that he had found out a means of transmitting speech.

It is probable that in this matter, as in the greater number of modern inventions, the original inventor obtained only insignificant results, and that it was the man who first succeeded in arranging his apparatus so as to obtain really striking results that received the honour of the discovery, and rendered it popular. Nevertheless, it would not be just not to acknowledge that the Reiss telephone *formed the starting-point of all the others*; and that is what I have said and repeated in all my writings. Mr. Bell himself owned it in his paper, which was read at the Society of Telegraphic Engineers in London. As a last argument I will say that if the transmission of speech had been obtained by Mr. Reiss in 1863, as Mr. Thompson asserts, the discovery would have attracted as much attention at that time as when it was announced to us from America in 1876. I now come to Mr. Henry C. Buck's letter inserted in the ELECTRICAL REVIEW for the 15th inst. It is said there that Professor Dolbear had invented his telephonic system before the date which I have fixed for the researches of M. Herz. If this be so, how is it that the system, the excellent effects obtained from which I observed myself at last year's exhibition, was not made public before the middle of the year 1881? Mr. Buck will admit that a writer can only speak of inventions that have become public, and he will also acknowledge that as regards this question of priority we can only depend on the dates of patents or of publications appearing at certain periods. Now, the American journals, at any rate those we have received in France, did not begin to speak of Professor Dolbear's telephone with condenser until the middle of 1881, and even after having described M. Dunand's system. Mr. Buck, in his letter, does not touch upon the date of Professor Dolbear's first researches. It seems to me, however, that instruments of such importance deserved to occupy the attention of scientific journals as soon as they were constructed. All that I can say is that the patent of Dr. Herz dates from the beginning of June, 1880. I will also say to Mr. Buck, as well as to Mr. S. Thompson, that, being in no way interested in this question of invention, I wish to write in the interests of truth alone, and that when my assertions are *proved* to me to be incorrect I am quite ready to rectify them.

TH. DU MONCEL.

Lebisey, *July 17th*, 1882.

NOTES.

SCIENTIFIC REPORTS ON ELECTRIC LIGHTS.—We extract the following from the advertisements of J. B. Rogers' Electric Light and Power Company. It is from the report of J. E. H. Gordon, Esq., B.A., M.S.T.E. :—

> Having been requested by the directors to examine Mr. Rogers' Electric Incandescent Lamps, I visited his show rooms, 47, Holborn Viaduct, on the evening of June 1st, 1882.
>
> As a preliminary step to the determination of the efficiency, I took a lamp at random from the electrolier and had it moved into a dark passage behind the show room, where I determined its candle-power. I found it to be 34 candles.
>
> On June 2nd, 20 lamps, including the one whose candle-power I had taken, were sent to me to experiment on. The result of a number of experiments showed that when worked to 34 candles, the lamps had an efficiency of 242 candles per electric horse-power.
>
> This is an extremely high efficiency, being sensibly equal to that of the Swan lamps, and much superior to that of Edison's.
>
> In order to test the strength and probable durability of the lamps, I worked some of them with powerful currents at temperature and candle-power much above those at which they are intended to be used.
>
> I worked one of the 34-candle lamps to a light of 140 candles, when the efficiency was no less than 536 candles per electric horse-power. The lamp stood this enormous temperature for 5½ minutes before the filament broke. I consider this a very severe test of the strength of the filament, and the result an eminently satisfactory one.
>
> To sum up, I can speak in high terms of the lamps constructed by Mr. Rogers.

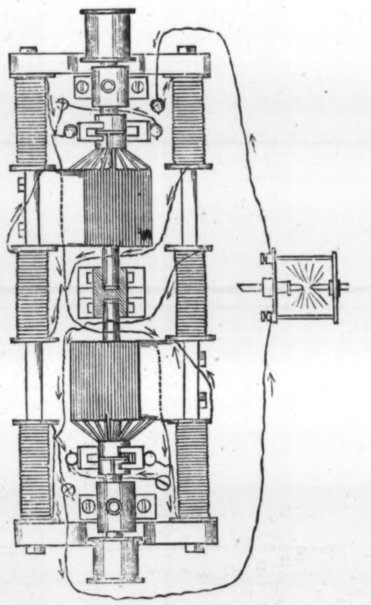
We are astonished that men of high scientific standing should allow themselves to pose as authorities on electric lighting without first being sure that their statements are correct.

Taking Mr. Gordon's first assertion that the Rogers lamp when worked at 34 candles gives an efficiency of 242 candles per electric horse-power, this result is said to be sensibly equal to Swan's, and much superior to that of Edison's. We beg to call Mr. Gordon's attention to the paper by W. Crookes, F.R.S., reporting on the incandescent lamps at the late Electrical Exhibition in Paris, and published in full in our issue of June 17th. When the Edison lamps were worked at 32 candle-power (two less than that of Rogers', be it noted), the efficiency per horse-power averaged 300 candles. Therefore even nine months ago the Edison lamps showed a higher value than the present Rogers lamp by nearly 20 per cent. In regard to the second experiment of Mr. Gordon, which is useless and misleading, we need only mention that months ago single Maxim lamps were tested by Professors Ayrton and Perry from their normal candle-power to 1,000 or more, and that the efficiency per electrical horse-power rose to 1,100.

We can only express our regret that Mr. Gordon should lend his name to any company without satisfying himself as to what has been published before concerning the value of the incandescent lamps at present in use. As the public must necessarily depend upon scientific authority for basing their decisions before investing, it would be well if experts dropped the misleading and utterly valueless methods generally adopted in wording their reports.

DYNAMO-ELECTRIC MACHINE.—Patent No. 259,791, filed in the United States of America Patent Office November 21st, 1881, by Charles E. Ball :—

Brief.—The armatures are revolved before one pole only of the field-magnet. Two armatures are mounted on independent shafts and connected in series with each other and the field-magnet coils, each armature rotating before one pole of the field-magnet.



Claim.—1. In a dynamo-electric machine, a single electro-magnet and an armature located and adapted to rotate within the inductive field of only one of the poles of such magnet, substantially as set forth.

2. In a dynamo-electric machine, the combination of two armatures and an electro-magnet or magnets, each of said armatures being arranged and adapted to rotate in the inductive field of only a single pole of such magnet or magnets, substantially as set forth.

3. In a dynamo-electric machine, the combination of two armatures and two poles of an electro-magnet or magnets, each of said armatures rotating in the inductive field of only a single pole, and said armatures and magnet or magnets being in the same circuit, substantially as set forth.

4. In a dynamo-electric machine, the combination of two armatures on independent shafts, whereby they may be rotated in opposite directions, and an electro-magnet or magnets in circuit therewith, each of said armatures being located and adapted to be rotated within the inductive field of only one pole of a magnet, substantially as set forth.

5. In a dynamo-electric machine, the combination of two armatures and an electro-magnet or magnets having pole-pieces on opposite sides of the machines, said armatures and magnet or magnets being relatively arranged substantially as described, whereby each of said armatures is located and adapted to be rotated within the inductive field of only one magnetic pole, substantially as set forth.

6. The combination, in a dynamo-electric machine, of two arma-

tures and an electro-magnet or magnets having pole-pieces on opposite sides, each of said armatures being located and adapted to rotate in the inductive field of only one pole of a magnet, said armatures and electro-magnets being connected substantially as described, whereby the circuit is direct from one armature to the other, and through all the helices of the magnets successively, substantially as shown and described.

7. The combination of two armatures on independent shafts, and an electro-magnet or magnets having pole-pieces on opposite sides of said armatures, the latter being located and adapted to rotate each within the inductive field of only one magnetic pole, said armature and magnet or magnets being in the same circuits, substantially as set forth.

THE MAXIM-WESTON COMPANY'S ARC LAMP.—The chairman of the Maxim-Weston Company, in order to show the superiority of the Company's system, gave an extract from a paper by Mr. Sang, read before the Gas Institute in June last. The following comparison of lights was made: Duplex system light, 114 candles; Brush, 557; Maxim-Weston, 1,406. As there is no mention of horse-power used in producing these results they may be put in the category of "Half truths and whole truths." Colonel Gilbey, in the course of his remarks, said he believed that wherever the Company's lights were shown they extinguished everything else. Leaving these egotistical remarks for the shareholders of the Company to pride themselves on, we do believe that it was a wise proceeding on the part of the directors to attach a new name to the Company, and we shall therefore be glad to see it prosper under new auspices.

THE LIGHTING OF PUBLIC THOROUGHFARES.—The Engineer to the Commissioners of Sewers says:—"For public thoroughfares, uniform distribution of light, generally speaking, best meets the public requirements, and this can be most successfully obtained by many small lights at small distances apart. Powerful centres of light at long intervals apart give intense brightness with deep shadows in their immediate vicinity, and distribute the light very unequally over the areas assigned to them; tested by this principle the excess of light given by the electric lamps was much less valuable than might be supposed."

ELECTRIC DOMESTIC LIGHTING.—If the electric light is ever to become popular it must, the *Building and Engineering Times* says, be adapted to the indoor and everyday needs of the mercantile community especially, to the wants of the home, and it must also be brought within the bounds of financial economy. To achieve these ends a fair opportunity offers in the City of London, where several of the leading electric light companies are now working their systems in competition with each other alike in point of excellence and of cost, and the opportunity thus afforded is made all the more valuable by the fact that a large body of the shopkeepers and merchants along the various routes are willing and anxious to have the new illuminant applied to their premises, and have memorialised the City Commission of Sewers to that effect. It has been one of the salient statements of the electric light companies that they could split up their supply into sufficient detail to furnish illumination for domestic lighting; they apparently longed for the opportunity of doing so, and they have on many occasions made attempts at this with isolated shops or warehouses. But the circumstances indicated above are such as have hitherto given no opportunity in London for the companies to show us what they can do efficiently and cheaply, and it is therefore a pity that delays and complications should be imported, as they have been, by the Commissioners, who elected that the petition from the merchants and traders should be referred back for further consideration. What we want is light; literally as regards illumination, and figuratively as to the capabilities of the companies, and it is a pity that obstructions should be created in any quarter.

FIRE RISKS FROM ELECTRIC LIGHTING.—The following form has been adopted by the fire underwriters of Baltimore, Md., to be placed upon policies when electric lights are introduced into premises: "Privilege granted to use the electric light in the within-mentioned premises, provided the assured holds a certificate and guarantee from the company wishing the light that the equipment is and shall be maintained according to the standard of the New York Board of Fire Underwriters."—*The New York Electrician.*

EDISON'S ELECTRIC LIGHT.—We read in *La Lumière Electrique* that the Edison Electric Lighting Company is now making the necessary preparations to put up lamps of their system in Paris.

Up to the present they have only occupied themselves with orders for the fitting of their lamps received from different towns in Europe, among others, Amsterdam, Antwerp, Brussels, Berlin, Frankfort, Sarreguemines, Brünn in Moravia, Steier, Vienna, Milan, and Bologna. In the first of these towns a central station is now being established, intended to feed 2,000 lamps distributed in different parts of the town. In Antwerp, a sugar refinery is lighted by 200 lamps of this system. In Brussels, the Museum du Nord is also lighted in this way, and they are now occupied in opening for that town a central station. In Frankfort, there are two establishments, each burning 60 lamps. In Sarreguemines, 400 lamps are at work. In Brünn, the new theatre will be lighted by 900 lamps, and further orders are being given to the company. In Steier, near Linz, they have just arranged for 60 lamps, and in Vienna, three places of the same importance are now lighted by their system. Finally, in Milan, they have arranged to light up two places, and in Bologna a large mill will be supplied with their lights.

Besides supplying these places with the Edison lamps, a few others have been lighted by other companies, who made their arrangements direct with the inventor. Among these we may mention the lighting of a large cornmill, in Gillamont, Switzerland, of which we spoke in our number of June 24th (*See* ELECTRICAL REVIEW of July 1st). We intend shortly to give a description of the works, where Mr. Edison's apparatus are manufactured, situated in Ivry, near Paris, and which are at present in full swing under the superintendence of Mr. Batchelor, the assistant of Mr. Edison, and who, with Mr. Otto A. Moses, organised last year his exhibition in the Palais de l'Industrie.

ELECTRIC LIGHT IN SALFORD.—After an installation of four years' standing which has given entire satisfaction and been entirely free from repairing expenses the firm of J. Bury, dyer and finisher, Salford, has made an addition of two of the British Electric Light Company's Gramme machines. The making-up room, which was formerly lit by 90 gas burners, rendering the atmosphere of the room very unpleasant during night-work, has been fitted with 60 incandescent lamps, which obviate the above inconvenience. In the room is fixed a regulator, which enables the foreman to put out any number of lights he requires. The dye house is illuminated by two Brockie arc lights, which enable the foreman to match his colours at night as well as in daylight. The whole of the arrangements were carried out by Messrs. H. Bury and G. Tyndall, Electric Light Engineers and Agents for the British Electric Light Company, Manchester.

UNDERGROUND ELECTRIC LIGHT WIRES.—The *Athenæum* states that Professor Houston, of Philadelphia, reports, after a series of elaborate investigations, that wires for the electric light are in every way less liable to accident if placed in the earth than if placed overhead. The municipal authorities, therefore, of Chicago have determined that the wires for lighting their city shall be placed underground.

THE JABLOCHKOFF ELECTRIC LIGHT.—The Thames Embankment and other places lighted from the station of the Jablochkoff Company have been temporarily bereft of the services of that effective and wonderfully reliable system owing to an accident to the steam engine. It was stated when the lamps went out on Monday evening last that two or three days must elapse before they could be again put in action.

NEW ELECTRIC LAMPS.—At 374, Euston Road, N.W., is to be seen an arc electric lamp called the "Diamond." It is extremely simple and light, and its actuating mechanism appears likely to compare favourably with any at present known. As we could not gain much information concerning the object of the exhibit in the Euston Road, not even to the extent of the inventor's name, we do not now propose to do more than merely allude to it.

We have recently had an opportunity of seeing in action the arc lamps of Messrs. F. M. Rogers and Jarman, and also the dynamo-electric machine of the latter. We cannot yet describe them, as certain matters connected with the patents are not quite settled. The main objects aimed at, as far as both machine and lamps are concerned, has been to simplify their construction, and so produce them at a lower rate than is now paid for these articles.

Mr. Jarman is, we believe, now experimenting on an incandescent lamp devised by himself, so that it is shortly expected that the above-named inventors will have a complete system on view. We shall reserve all criticisms on the points involved in the respective lamps and machine for a future occasion.

The Electric Lighting Bill.—In the Parliamentary discussion on this Bill, Colonel Makins asserted his belief that of the aggregate capital of £13,000,000 or £14,000,000 raised by the 55 electric lighting companies registered lately, the greater proportion had been expended on inventors and promoters.

Electric Light Shares.—Various statements have been put forth to account for the late rapid fall in Brush and Hammond electric light shares. One was to the effect that it is in consequence of the insecurity of the patent rights of the Brush apparatus. In the money market article of the *Standard* of last Wednesday, it says that the fall is due to the results disclosed at the meeting of the Brush Company. It appears that the available balance in hand is £245,000, which would be sufficient to enable a return of the paid-up capital, instead of half as much more as the market had anticipated. Can it be that the rules and regulations concerning fire risks from the electric light, issued by the Society of Telegraph Engineers and of Electricians, explain it? Rule 20 reads in part:—There should never be a difference of potential of more than 200 *volts* between any two points in the same room.

The Electric Light in the City.—At the fortnightly meeting of the Commissioners of Sewers held last Tuesday, Mr. Pannell presented a report from the Streets Committee relative to the Edison electric light on the Holborn Viaduct, and stating that they have arranged for the same to be continued for a further period of six months at the cost of gas.

The report was adopted.

Mr. Bedford said there was a magnificent light on the Holborn Viaduct, close to St. Andrew's Church. He wished to know if the engineer could give him any information on the subject?

The engineer said he supposed it was some recent experiment, but it had not been notified to him.

The clerk (Mr. Blake) read the report of the Streets Committee, which has been printed and circulated, on their proceedings relative to the applications made for an extension of the experiments in electric lighting; submitting an abstract of tenders received, and expressing an opinion that it is not desirable to proceed further until Parliament has decided the principle upon which electric lighting generally shall be permitted.

Mr. Innes thereupon moved, "That the report be referred back, with instructions to forthwith carry out the electric lighting through the tendering companies, with the light of private lighting in the districts for three years added to their contracts, reporting in the first instance on the cost of the street lighting after tenders have been made on the footing of the right of private lighting." He traced the action of the commission in connection with the electric light from the commencement, and urged that something definite should now be done. They were told that this was a speculation, but every improvement was a speculation in the first instance. The right of private lighting had been practically conceded in the case of the Edison company, who had commenced operations on the Holborn Viaduct. The other companies meantime were handicapped. They were told to wait for legislative action, but no legislation was required. He was averse to the commission making experiments, but contented that power should be given to the companies to make experiments without further delay. The divisions in the committee would prevent them coming to any decision, and he therefore thought the subject should be settled by the commission.

Mr. Morrison seconded the motion.

Mr. Shooter opposed the amendment, trusting that the commission would agree with the committee in their report. A discussion ensued, in the course of which Mr. W. J. Scott twitted the commission with trying to obstruct electric lighting. He had no hesitation in saying that the opposition to the amendment came from gas company interest. Mr. Shaw denied that there was any truth in the accusation made by the previous speaker; and as for the commission being obstructives, he pointed out that they had been the first to give an opportunity for experiments being made with the new light. The discussion was continued by Mr. Waller, Mr. Ashby, and several other members, and eventually the amendment was lost upon a show of hands being taken. A division was demanded, and the numbers were—for the amendment, 6; against, 17. The original motion to agree with the committee in their report was then agreed to, and after transacting some other business the commission adjourned.

Incandescent Electric Lamps.—A preliminary announcement emanating from the London and Provincial Electric Light and Power Company, to the effect that a limited company is now in course of formation for supplying Kensington, Hammersmith, Notting Hill, and other districts with the electric light by means of the Chertemps arc and British incandescent lamps, speaks thus of the latter: "The signal success which has attended the lighting of Stafford House by these incandescent lamps points to this as the most complete system."

The "Morna" Cable Steamer.—We read the following in the *Oban Telegraph* of the 14th inst.:—

The ss. *Morna*, of Leith, commanded by Capt. Howling, arrived here on Tuesday morning on her way to repair the broken cable between Oban and Mull. This steamer is fitted up with all the necessary appliances, and, in addition to the crew, there are thirty cable men and a large staff of electricians on board. On Tuesday afternoon the injured cable was tested, and the fracture found to exist in the vicinity of the Lady Rock. After completing the repairs on the Mull cable, the *Morna* proceeds to Yell Sound, in Shetland, for a similar purpose.

With reference to the fracture on the Mull cable, it may be stated that on examination it was discovered that the cable had been maliciously cut, in all probability by the crew of some vessel whose anchor had fouled, and, in order to save some slight delay in clearing the submarine line, a process easily accomplished. In view of the serious consequences to the country in expense and inconvenience, this must be looked upon as a most aggravated offence, and one deserving of heavy punishment. The cable was thoroughly repaired yesterday, and telegraphic communication resumed. The operations, which have been so speedily and successfully accomplished, were under the supervision of Mr. David Lumsden, Mr. Albrow, and Captain Hayward, electricians of the Submarine Department G. P. O., while Mr. Wright, the energetic local superintendent, lent intelligent and useful aid in shore work. Captain Howling, the commander of the *Morna*, is a most experienced navigator, whose skilful handling of his vessel greatly facilitates the progress of the work for which the steamer has been chartered. From later information we find that the cable in Yell Sound was made good on the afternoon of Tuesday last.

The Telegraph Steamer "International."—The India-Rubber, Gutta-Percha, and Telegraph Works Company received on the 18th inst. a telegram from Mr. Theophilus Smith, engineer-in-charge, informing them of the successful completion of the repairs of the Havana-Key West Cable, for which the *International* had been chartered by the International Ocean Telegraph Company of New York. After coaling and provisioning the *International* leaves Key West for London.

New Zealand Telegraphs.—The business of the New Zealand Telegraph Department during the quarter ending December, 1881, showed a satisfactory increase on that transacted during the corresponding quarter of 1880, the total number of paid messages for the former being 308,462—value £20,404—and for the latter, 263,908—value £17,188. The increase of messages was thus 44,554, and of receipts, £3,216. The Government telegrams numbered 51,734, the value being £5,654, or a decrease in number of 10,514 and in value of £1,140 on the December quarter of 1880.

A New Method of Telegraph Translation.—Sir James Anderson and Mr. Benjamin Smith, of the Eastern Telegraph Company, have introduced a system of personal translation by means of which the dispatch of messages is facilitated, delay avoided, and greater accuracy obtained. At present, as is well known, messages are written down by a clerk as they are received at the end of each section, and then passed on to another clerk, who transmits them over the next section, and so on till the messages reach their destination. The new method is to cause the clerk who receives the messages, say from section A, to send them at the same time over section B, so that while he is reading the messages from the receiver he is transmitting them to the next relay. The advantages of this system are obvious. There is no writing down of the messages at the relay stations, and passing on to other clerks; the whole of the attention of the operators can be given to the receipt and transmission of the messages, and greater accuracy thereby attained. Where simplex is worked one clerk will take the place of two, and where duplex is in operation two men will in several instances replace six. The saving thus effected in the expense of the *personnel*, stationery, and apparatus will not be inconsiderable. We understand the system has already been adopted on the submarine lines of the Eastern, Eastern Extension, and South African Telegraph Companies.

THE PROPOSED ATLANTIC CABLES.—The *Illustrated London News* of Saturday last thus comments on the proposed Atlantic cables:—"Yet further competition is in store for the owners of the Atlantic telegraph cables. The controllers of the Baltimore and Ohio Railroad have decided to lay two cables across the Atlantic, one to England and the other to Portugal. It is surprising how the money is found for such enterprises, as of the many cables which have been laid for competing purposes not one has long remained outside, and all are now either owned by the original company or worked in unison with it; while every £100 spent in laying such cables speedily comes to be very much less than that. The result has so far been that the public has not derived the advantages usually following competition, while stockholders have lost in both capital and income from the excessive number of cables employed in the service. The fruit of this experience is that some degree of monopoly is desirable in the case of cables. Concessions for terms of years have been granted to the companies serving most of the other routes, but the Atlantic is quite open. The public is as well and economically served on the monopoly routes as on the open. The capital sunk in the open is at a discount of 50 per cent., that in the busiest of the monopoly routes is at a premium. With these facts before them European investors must indeed be foolish if they provide any of the capital for the new cables."

TELEGRAPHIC COMMUNICATION WITH THE SUEZ CANAL.—It is said that the means of maintaining direct telegraphic communication with the Suez Canal are now under the consideration of Her Majesty's Government.

ELECTRICITY IN WARFARE.—We understand that concurrently with the field telegraph and electric light, the telephone is to be tried in the Egyptian campaign.

FORMS FOR TELEGRAMS.—At a meeting of the Greenock Chamber of Commerce, held on the 13th inst., it was stated that efforts had been made to induce the post-office authorities to introduce a larger telegram form than that now in use. The directors were now able to report that the postmaster-general had given instructions that telegrams will not hereafter require to be written on special forms but may be handed in on any sheet of paper; also that telegrams of an urgent nature will be transmitted at any hour during the night from the Greenock post-office to any office having night officials on payment of an extra charge of one shilling.

SECRECY OF TELEGRAMS.—Replying to Mr. Pulestown, in the House of Commons, on Thursday, the 13th inst., Mr. Fawcett said that the practice which had hitherto prevailed in the post-office was not to give up telegrams, except on the applications either of the sender or receiver. Some doubt, however, has arisen whether they had legal power thus to give up telegrams, and in view of this legal doubt he proposed in the Post-office Bill shortly to be introduced to insert a clause which would place telegrams, with regard to secrecy, in the same position that letters now were.

TELEPHONES IN ENGLAND.—It is well known that the telephonic industry in America has made enormous strides. while in England the matter has made but little progress, Now however that the granting of the licences for the formation of telephone exchanges has been decided upon by the Postmaster-General, there appears to be no reason why we should not soon be on level terms with our American cousins. The towns of England are comparatively such short distances apart, that we have unusual facilities from this fact alone. Again, the undulatory current is not claimed in this country, but it is the United States. Therefore we may soon expect to see England to the fore with the telephone.

THE TELEPHONE IN ALEXANDRIA.—The *Standard* correspondent, in a telegram dated Sunday last, says police-stations are now established in all parts of the town, and the Oriental Telephone Company are laying down wires to place them in connection with each other.

THE WORLD AND THE TELEPHONE MONOPOLY.—In its City Notes, the *World* says:—Another new Telephone Company is announced. We hope, at all events, it will supply something good and cheap, for the present monopolist in that line is anything but a satisfactory servant to the public. Complaints are incessant, either that its instruments tell too much, lets those hear secrets who should not hear them, or that they will not work at all.

THE TELEPHONE IN SCOTLAND.—The National Telephone Company (Limited) have established telephone communication between Newport, Fife, and their exchange in Dundee. A wire is led across the standing portions of the Tay Bridge, and in the gap an 8-wire cable has been laid. From the south end of the bridge the wire is carried along the public road to the village. In Newport an exchange will be opened, the subscribers to which will, in addition to the convenience of conversing with each other, have the advantage of speaking to any subscriber to the company's Dundee exchange. The exchange at Newport will be open from 6.30 a.m. to 11 p.m. Several subscribers have already been obtained. Tayport is to be similarly treated. The National Telephone Company are to supply the contractors for the new Tay Bridge with telephone communication between the works on the one side of the river and those on the other side.

TELEPHONE SHARES.—It might almost be supposed that the decision of the Postmaster-General in regard to telephone licences had leaked out before his statement in Parliament, as on the preceding day the shares of the United Telephone Company fell £1 per share. Altogether they have fallen recently from 16 to 10¾; but the last quotation, on the 19th inst., was 11¼—11¾.

THE LIBRARY OF THE SOCIETY OF TELEGRAPH ENGINEERS AND OF ELECTRICIANS.—Mr. A. J. Frost has just succeeded in acquiring for the Library of the Society of Telegraph Engineers and of Electricians a copy of the fine work Vincentius (Belloracensis), "Speculum Naturale," 2 vols. folio, 1473-76. Vincentius was Bishop of Beauvais, and wrote about the year 1250, and the work now referred to contains probably the earliest *printed* allusion to the polarity of the magnetised needle and its use in navigation. As a specimen of typography alone, independent of its literary interest, it is well worth a visit to the library, and we consider that Mr. Frost has been fortunate in obtaining this interesting and valuable work as an addition to the already important collection under his care. In these days of business activity such collections are apt to be forgotten or overlooked, and it is gratifying to feel that some one is giving attention to the completion of such important collections as those possessed by the society and Mr. Latimer Clark, and which cannot fail in the future to increase in value and interest. While referring to the library of the society we may add that an important and most complete list of works on electric lighting will be found in Kuhn's "Handbuch der angewandten Elektricitätslehre." 8vo. Leipzig. 1866.

THE AWARDS AT THE CRYSTAL PALACE EXHIBITION.—In our correspondence columns will be found a letter referring to these awards, and as we are frequently asked when they are to be made we should be glad if any of our readers can give information on the subject. Surely sufficient time has elapsed. Perhaps the Honorary Council of Advice will give a little consideration to this matter.

The Electrical Insulator Manufacturing Company.—The operations of this company form a district branch of electrical work, but whether such a business will be of a sufficiently wide nature to justify the company's belief remains to be seen. There are certain statements contained in the prospectus which we feel called upon to challenge. In regard to the manufacture of insulators for home consumption we believe the postal authorities are almost the only people who require insulators, and these, we believe, are supplied mainly by one firm only. The supply required by the railway companies is but small, as they are generally only wanted for maintenance purposes. Telephone wires will probably soon be wholly laid underground. Therefore we think that the glowing statements of the promoters concerning the enormous business to be done at home in insulators must be taken *cum grano salis*. The scientific reports on the superior nature of this clay are not altogether in accordance with facts—that is to say, the importance of a material free from iron so far as insulators are concerned is much exaggerated. We believe that the several well-known firms of insulator manufacturers are quite equal, with their long experience, to supply a very largely increased demand at any moment they might be called upon to do so. We notice that the company purposes manufacturing other goods beyond those of an electrical nature; but the title of the company and the wording of the prospectus naturally seem to point to the conclusion that it is promoted to take advantage of the present electrical craze. We do not, however, consider that the statements with regard to the company's connection with the electrical industry are by any means exact.

A New Electric Motor.—M. Paul Jablochkoff, of electric light celebrity, has paid a recent visit to London. During his stay he submitted to some of his scientific friends a new electric motor, which possesses all the merits which characterise M. Jablochkoff's inventions—viz., extreme simplicity. If what we hear is confirmed, distribution of power by this new motor will become practicable at rates which would hardly have been thought possible by any of the means at present known. We need hardly add that this invention becomes, as a matter of course, the property of the newly-formed company bearing M. Jablochkoff's name. We believe that we are correct in stating that the firm of M. Breguet will work the French patent for this new motor.

Personal.—Mr. Johnston, the well-known editor and proprietor of the New York *Operator*, has recently been visiting London. This is the first time we have had the pleasure of meeting Mr. Johnston, and we can fully endorse from our personal experience the opinions previously formed of his frank and humorous nature, which is so apparent in his writings. Mr. Johnston is not a stranger to London, and his first experiences in electrical matters were gained in the mother country. We trust that his trip will be throughout of an enjoyable kind, and that on his return he may reap still further benefit from the journal he has so long successfully and ably conducted.

To Electric Works Companies.—It may be of service to some of the new companies to direct their attention to the advertisement for the sale of premises and plant suitable for such works, particulars of which are given on one of our supplementary pages.

The International Electric and Gas Exhibition.—This proposed exhibition at the Crystal Palace is to commence in October next, and continue till the end of Easter week, 1883. Intending applicants for space should apply before the 1st of August. A limited amount of engine-power will be supplied, as far as it goes, to exhibitors desirous of taking advantage of this offer. Applications must, however, be made before the above date. Whatever work may be necessary to place and decorate exhibits must be done by the exhibitors at their sole expense, and always subject to the supervision and approval of the directors. We should imagine that as far as those connected with electric lighting are concerned, their thoughts will turn more in the direction of doing successful work during the forthcoming winter and paying dividends on capital employed. Exhibitions are very well from scientific or commercial points of view once in awhile; but it is possible to have too much of a good thing. That just closed at the Crystal Palace answered its purpose; but those exhibitors fortunate enough to float companies on the strength of their efforts in this direction will not, we should imagine, feel inclined to face a second heavy expense in so short a time, but will rather devote all their energies to the formation of a good and profitable business.

Exhibition of Practical Electric Development.—It is preposed to devote the buildings and premises of the Royal Aquarium, at Westminster, to the above purpose, from November 1st next to March 1st, 1883. It is instituted for the purpose of practically developing subsidiary points in the economical use of electric energy. Prizes are to be given for eighteen different subjects, and amongst them may be named:—The best systems of storage and generator for railway trains; the best systems of storage batteries; the best electro-motor for stationary or tram-car work: (*a*), absorbing ½ horse-power; (*b*), 2½ horse-power; (*c*), 5 horse-power. The best system of dynamos for compensating change in resistance of external circuit, &c.; the best electric meter; the best system of street mains or leads; the best photometer, and various other matters. The electric engineer to the proposed exhibition is Mr. W. D. Gooch, of 17, Royal Exchange, London.

To our Readers.—We beg to inform our friends and subscribers that Vol. X. of the Electrical Review can now be had handsomely bound, by applying to Messrs. Haughton & Co., 10, Paternoster Row, E.C. Cases for binding can also be obtained. For particulars see advertisement on page 11 of supplement.

To Medallists of the Paris Electrical Exhibition.—Electrotypes of the Paris medal may be had for the purpose of insertion in advertisements and trade circulars, &c., at moderate rates, on application to the manager of the Electrical Review, 22, Paternoster Row, E.C.

NEW COMPANIES REGISTERED.

West Middlesex Electric Lighting Company (Limited).—Capital £100,000, in £5 shares. Office, 14, King Street, West Hammersmith. Objects: To purchase a licence acquired by Charles Cordingley from the British Electric Light Company (Limited), for the use of the Gramme dynamo machines, the British incandescent lamp, and Brockie's arc lamp. The purchase consideration is £12,500 in cash and £12,500 in fully paid shares. Signatories: J. H. Swann, C.E., 110, Cannon Street, 20 shares; W. J. Colley, Mill Hill, N.W., 20 shares; C. J. Parker, Hammersmith Road, 20 shares; J. Barnes, Hammersmith Road, one share; F. Wingrove, Hammersmith Road, one share; W. Pickersgill, 87, Arlington Road, Regent's Park, 10 shares; G. H. Hutchinson, 1, Laurence Pountney Hill, E.C., one share. Directing qualification, 20 shares; the signatories nominate the first directors. Remuneration, £1,000 per annum. Registered 13th inst. by Watson, Son, and Room, 12, Bouverie Street, E.C.

Electrical Insulator Manufacturing Company (Limited).—Capital £100,000, in £1 shares. Objects: To carry on business as potters and manufacturers of electrical insulators in any material and of every kind. Signatories (with one share each): R. Marsh, 79, York Road, Lambeth; C. Bate, 78, Alexand Road, South Hampstead; C. E. Hewitt, 10, Thornsett Road, Anerley; T. J. Bradfield, 193, Clapham Park Road; E. H. Wilson, 10, Buckingham Street, Strand; J. Evans, 2, Crogsland Road, Haverstock Hill; S. H. Barlow, 38, Warbeck Road, Shepherd's Bush. Directing qualification, 100 shares; remuneration, £500 per annum, with an additional £250 after 10 per cent. per annum dividend has been paid. Registered 13th inst. by Pyke and Minchin, 31, Lombard Street.

NEW PATENTS—1882.

3171. "Governing marine engines by electricity." W. W. GIRDWOOD. Dated July 5.

3172. "Voltaic batteries." J. IMRAY. (Communicated by P. Jablochkoff.) Dated July 5.

3173. "A new or improved apparatus for recording speech." J. IMRAY. (Communicated by A. Gentilli and L. C. Alexander.) Dated July 5.

3175. "Improvements in the materials for and in the construction of electric insulating apparatus and in the means of preserving the same." W. F. BOTTOMLEY, J. H. BARRY, and J. J. LUNDY. Dated July 5.

3181. "Dynamo-electric machines." A. LÉVY. (Communicated by D. Lachaussée.) Dated July 5.

3190. "Electric and other tell-tales for indicating and registering." A. SCHWEITZER and T. LAWRIE. Dated July 6.

3204. "Apparatus for the generation, regulation, and utilisation of electric currents." W. R. LAKE. (Communicated by G. Thomson.) Dated July 6.

3217. "Machinery or apparatus for applying anti-induction coverings to insulated electrical conducting wires." G. S. PAGE. (Communicated by J. M. Stearns.) Dated July 7.

3219. "Supports for underground electrical conductors and their conduits." G. S. PAGE. (Communicated by J. M. Stearns.) Dated July 7.

3221. "Secondary batteries or accumulators." R. H. WOODLEY and H. F. JOEL. Dated July 7.

3226. "An improved electro-magnetic motor." E. TOYNBEE. Dated July 7.

3233. "Electric clocks." J. P. A. SCHLAEFLI. Dated July 7.

3236. "Arc electric lamps." F. M. ROGERS. Dated July 7.

3240. "Manufacture and preparation of plates for electric accumulators." T. S. SARNEY and J. M. ALPROVIDGE. Dated July 8.

3244. "Incandescing electric lamps." T. J. HANDFORD. (Communicated by C. A. van Cleve.) Dated July 8.

3255. "Improvements in the construction of incandescent electric lamps and in apparatus therefor, which apparatus is also applicable for other like uses." J. H. GARDINER. Dated July 8.

3263. "'Blocks' or 'cylinders' for incandescent lights." G. DAVIES. Dated July 10.

3271. "Electrical meters." T. J. HANDFORD. (Communicated by T. A. Edison.) Dated July 10.

3273. "Magnets." J. S. FAIRFAX. Dated July 10.

3279. "Electric lamps." J. S. BEEMAN. Dated July 11.

3281. "Arrangement and application of electrical conductors." F. JACOB. Dated July 11.

3296. "An improvement in preparing the sheet lead electrodes of secondary batteries with a view to their rapid formation." A. M. CLARK. (Communicated by G. Planté.) Dated July 11.

3303. "Secondary voltaic batteries." F. W. DURHAM and P. WARD. Dated July 12.

3315. "An improved method and process of and apparatus for coating or covering wire with copper or other metal (telegraph wire)." W. R. LAKE. (Communicated by T. Wallace.) Dated July 12. (*Complete.*)

3318. "Improved means and appliances or apparatus for producing or evolving, collecting, storing, and utilising electric energy for lighting and for general purposes, partly applicable for use in combination with coal gas." J. L. PULVERMACHER. Dated July 12.

3322. "Apparatus for producing, measuring, and distributing electric currents." J. M. M. MUNRO. Dated July 13.

3330. "Electric lighting and power distributing systems." S. PITT. (Communicated by E. T. Starr and W. J. Peyton.) Dated July 13. (*Complete.*)

3331. "Improved apparatus for making and breaking electric circuits." J. R. GIBSON. Dated July 13.

3334. "Improvements in the construction of dynamo-electric or magneto-electric and electro-dynamic machines and in governing or regulating the same." R. MATTHEWS. Dated July 14.

3335. "Telephones." S. M. YEATES. Dated July 14.

3339. "Arc regulator lamps." R. E. B. CROMPTON. Dated July 14.

3349. "Incandescent electric lamp appliances." J. S. BEEMAN. Dated July 14.

3350. "Electric lampholders and switches therefor, or for other purposes." J. S. BEEMAN. Dated July 14.

3351. "Improvements in apparatus for automatically shunting electric currents, and in apparatus for breaking circuits." J. S. BEEMAN. Dated July 14.

3355. "Means or apparatus employed in or for supplying electricity for light power and other purposes." T. J. HANDFORD. (Communicated by T. A. Edison.) Dated July 14.

3370. "Apparatus for automatically indicating the presence of fire or heat by electricity." E. EDWARDS. (Communicated by B. Carré.) Dated July 15.

3380. "An electrical haulage system and apparatus connected therewith." W. E. AYRTON and J. PERRY. Dated July 17.

3382. "Electric light appliances." H. J. HADDAN. (Communicated by G. H. A. Seymour.) Dated July 17.

3385. "A new or improved electric arc lamp." L. A. GROTH. (Communicated by C. P. Jürgensen.) Dated July 17.

3391. "Improvements in the manufacture of wire and in the apparatus employed therein." T. MORGAN. (Communicated by E. J. Levavasseur.) Dated July 17.

3393. "Electric lamps." J. D. F. ANDREWS. Dated July 17.

3409. "Plates for secondary batteries." W. TAYLOR and F. KING. Dated July 18.

3414. "Electric telegraph signalling apparatus." H. E. NEWTON. (Communicated by O. Zadig.) Dated July 18.

3418. "Improvements in electric arc lamps and in regulators therefor; applicable also to regulating electric currents for other purposes." S. Z. DE FERRANTI and A. THOMPSON. Dated July 18.

3419. "Dynamo electric machines or electric generators." S. Z. DE FERRANTI and A. THOMPSON. Dated July 18.

3420. "Dynamo-electric machines." W. P. THOMPSON. (Communicated by P. Payen and A. Sandron.) Dated July 18.

ABSTRACTS OF PUBLISHED SPECIFICATIONS, 1881.

4780. "Insulating electric conductors, &c." A. T. WOODWARD. Dated November 1. 6d. Relates to the mode of rendering the whole of the conductors and the test boxes entirely water and air proof, so that the insulation cannot be injured by moisture, and access can be had to the wires when required for the purpose of testing the same, and for taking off any lateral connections. Fig. 1 is a vertical section of the insulated telegraph conductors at two of the test or connection boxes, and fig. 2 is a cross section, at the line, *x*, *x*. The case or tube into which the electric conductors are laid is to be of any desired size or shape, according to the number of conductors it is to contain, and it is preferably of wood, but may be of metal or earthenware. Such a box is shown as square sectionally, with sides, *a*, bottom, *b*, and movable top, *c*. There is introduced into the bottom of the case, *a*, *b*, *c*, a layer of waterproof insulating material, such as hereafter described, or any other suitable bituminous or water-proof compound may be employed. At suitable distances apart there are testing, or connection boxes, *e*, introduced within the case, *a*, *b*, *c*, and the wires, or conductors, *f*, *f*, pass through holes at the ends of these boxes. The water-proof insulating material is introduced in a melted state into the case, *a*, *b*, around the electric conductors, and also entirely around the testing or connection boxes, *e*. In applying the water-proof insulating material it is preferable to introduce a layer on the bottom of the case, then place thereon the lowest range of parallel conductors, then another layer of waterproof insulating material, and another range of parallel wires, and so on. The water-proof insulating material flows all round the testing or connection boxes, and hermetically seals the same, and renders the box perfectly water and air tight. Where there are lateral connections they will usually be made before the cover of the box, *e*, is applied, but when these lateral connections have to be made to a previously laid cable the cover of the external case is removed, and the water-proofing material at the testing-box is removed, the insulating material broken up, and the cover of the testing-box removed, to give access to the electric conductors for testing or making lateral connections, after which the box is closed and hermetically sealed by the melted insulating material. The water-proof and insulating material which it is preferred to employ is prepared as next described. The inventor makes use of silica, such as glass, or quartz, in the form of a very fine powder, and vegetable or mineral resin or pitch. This latter substance should also be ground fine and thoroughly mixed with the silica, and there is added to the same wax, such as paraffine, beeswax, or spermaceti, and also oil, such as boiled or raw linseed oil. It is preferred to use about 66 parts by weight of silica to 34 parts of resin or pitch, and 26 parts of wax, more or less, and about three parts of oil. These are all thoroughly combined in the presence of sufficient heat to liquefy the resin; the mass is to be carefully and thoroughly stirred to render it homogeneous.

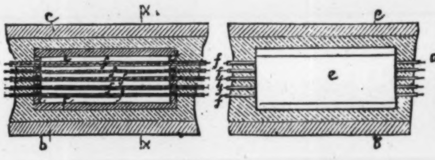


FIG. 1.

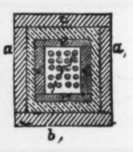


FIG 2.

5185. "Electric lamps." E. G. BREWER. (A communication from abroad by A. G. Waterhouse, of New York.) Dated November 28. 1s. Relates to electric lamps of the type in which carbon sticks or pencils are fed towards one another as they consume, the movement being controlled by a clutch or by wheel work, or by other suitable means, the action of which is governed by an electro-magnet or magnets. This invention consists, first, of certain novel constructions and arrangements of governing electro-magnets, of improved clutch or clamp devices for governing the descent of the carbon rod, and of a novel safety shunting device. Fig. 1 is a side view of a lamp having one arrangement of the electro-magnets, and showing also the safety shunting device. Fig. 2 is a top view of the electro-magnets partially in section. Figs. 3, 4, and 5 illustrate the clutches which are actuated by the movable electro-magnet. Fig. 6 is a detail of construction of the lamp illustrated in fig. 1. Figs. 7, 8, 9, and 10 illustrate modifications. Referring to figs. 1 and 2, A represents the base plate of a lamp upon which the enclosing frame and the supporting standards for the operating portions of the lamp are mounted; B represents the carbon rod or carrier; C is an upright plate secured to base, A, and having bolted to it brackets, D, D, in which the electro-magnets are supported; E represents an electro-magnet wound with coils of comparatively fine wire, which are included in a derived or branch circuit around the arc. The core of said electro-magnet is represented at F as supported in the bracket, D. G, G, are pole pieces connected to said core upon the outside of the bracket, and extending at right angles from the core towards the projecting pole pieces of a similar electro-magnet, H, wound with coarser wire, and with its coils in direct circuit with the carbons and the arc. The core of the latter electro-magnet is pivoted from brackets or clips, I, I, secured to brackets, D, by screws or other means, and is provided with rectangular pole extensions, K, K, projecting towards the pole pieces, G, G, and adapted to swing in close proximity to the latter, as indicated in fig. 1. The coils of magnets, H, E, are so wound and connected to the general circuit that the pole pieces G, K, in proximity to one another would be naturally of the same polarity, so that they would repel one another. The action or influence of the main circuit coil, H, is however sufficiently strong to overbalance the opposing influence of the coils of E, so as to cause the core of E to be polarised by induction from the core of H, so that when the lamp is working there is a positive attraction between the poles. When however the length of arc increases so as to cause more current to circulate in the derived circuit coils, E, the latter exerts a greater depolarising influence, and thus causes a diminution in the attraction between the poles so as to allow the poles, K, to drop away, and through any suitable means to release the carbons and allow it to feed. The means here shown consist of a clutch engaging with the carbon rod or carrier, B; said clutch consists of a perforated lever, L, hung at one end from an arm, R, best seen in fig. 3, supported from a crossbar, M, and resting at the other end by means of a set screw, N, passing through it upon the base plate, A. The bar, M, is supported by links, O, hung from the movable pole pieces, K, as shown in fig. 6. The edges of the perforation in L, or in a series of superposed steel plates, P, supported on the plate, L, and to be presently described, is adapted to engage with the carbon rod, B, when the plate, L, is tilted, so as to stop the movement downward of the rod, or to lift the rod so as to establish the electric arc. As thus constructed the lamp operates as follows:—When no current is passing the pole pieces, K, and the supported clutch rest by the action of gravity or a spring in a position where the clutch, L, does not engage with rod, B. The carbons are then in contact. When the current passes, the poles, K, and G, are attracted owing to the preponderating effect of the current circulating in coils, H. The clutch is thus tilted and lifted, raising the carbon rod, B, and separating the carbons to a distance dependent upon the adjustment of the screw, N, or of a suitable retracting spring acting upon K. When the arc lengthens by reason of waste of the carbons, more current circulates in E, and its depolarising influence is increased, so that the attraction between K and G is diminished and the carbon rod is thereby released, so that the carbon feeds downward.

FIG I

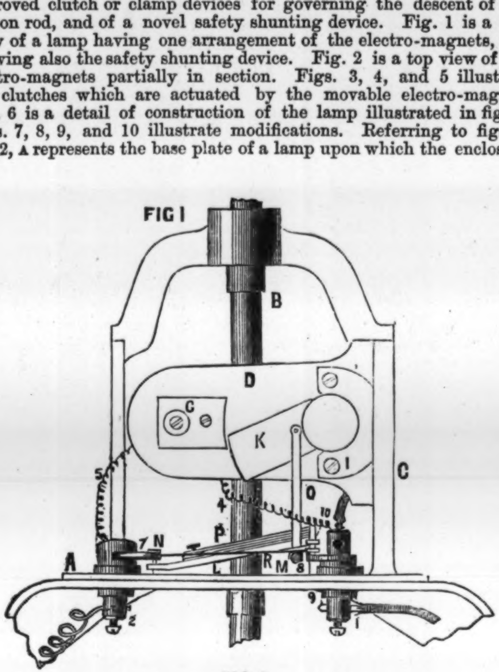


FIG 2

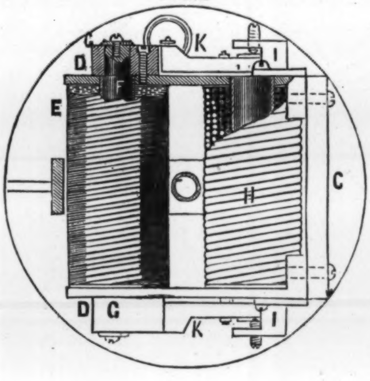


FIG 5

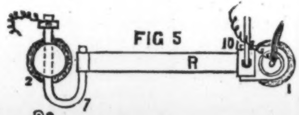


FIG 3

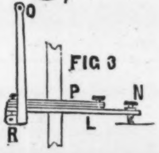


FIG 4

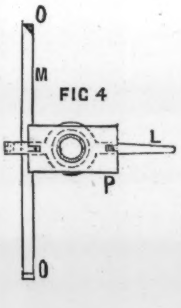
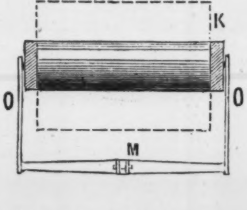
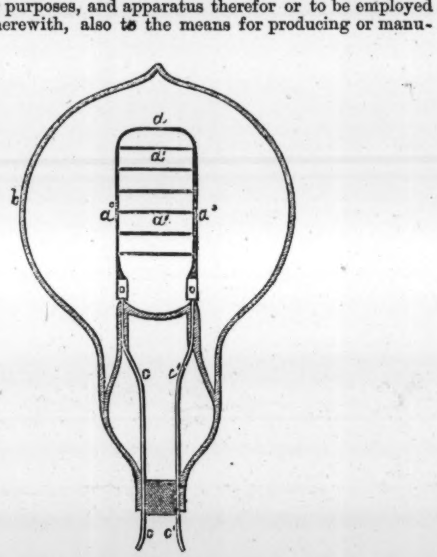


FIG 6



5233. "Utilisation of electricity for lighting, &c." W. R. LAKE. (A communication from abroad by J. S. Williams, of Paris.) Dated November 30. 1s. Relates to the utilisation of electricity for lighting or other purposes, and apparatus therefor or to be employed in connection therewith, also to the means for producing or manufacturing various parts of such apparatus. The figure is a centra section of one form of the improved lamp in which a conductor is employed having a series of transverse filaments. The invention also refers to electrical warming apparatus.



5261. "Secondary batteries." H. E. NEWTON. (A communication from abroad by Ernest Volckmar, of Paris.) Dated December 1. 6d. The object of this invention is to obtain secondary batteries which will give, with a minimum of weight and dimensions, the maximum of electrical energy. The improvements are as follows:—The inventor arranges a certain number of secondary couples in a single vessel. The plates are placed by preference horizontally one above the other. In this way there will be as many elements as there are plates, less one, each plate being at the same time the positive electrode of one couple and the negative electrode of the following couple, with the exception of the first and the last plates, which form the poles of the battery. The horizontal arrangement offers one peculiar advantage:—If one of the electrodes of this nature becomes disintegrated from any cause the disintegrated particles of a superior plate will fall on to the plate which is immediately below without causing the least disturbance, because these particles will unite themselves with the active matters of the support upon which they have fallen and identify themselves with them under the influence of the charging current.

5295. "Mechanism for regulating the feed of electrodes in electric lamps." H. E. Newton. (A communication from abroad by Alphonse Isidore Gravier, of Paris.) Dated December 3. 6d. Relates to the regulation of the electrodes in that class of electric lamps in which clockwork is employed, the object being to produce a more delicate regulation of the electrodes than has been heretofore obtained. For this purpose two electro-magnets are used to control the movements of an oscillating locking bar, which engages with the fly and scape wheel of the clock mechanism for the purpose of locking and releasing the same, and thus controlling its movements. The carbon electrode to be regulated is carried by a vertical rack-bar, which forms the propelling weight of the clock, and thus on the release of the scape wheel the feed of the carbon instantly commences. A tendency is given to this locking bar to drop into the locking position by the pressure of a light spring, a counterweight, or its equivalent. The electro-magnet situate on the weighted side of the locking bar is coiled with a comparatively thick wire and is set in the main circuit of the lamp. The office of this magnet, which is the more powerful one, is to draw forward the oscillating bar and retain it in its locking position. The electro-magnet on the opposite side of the locking bar is coiled with a fine wire to offer a greater resistance to the passage of a current than the coils of the more powerful magnet. The greater resistance magnet is placed in a secondary or derived circuit, one of its terminals being connected with a terminal of the other magnet. The effect of this arrangement is that when the arc has increased to such an extent as to offer an undue resistance to the passage of the current in the main circuit, an increased proportion of the current will pass to the derived circuit, thereby increasing the attractive power of the electro-magnet in that circuit to an extent that will enable it to pull over the locking bar, release the scape wheel, and set the clockwork in action. So soon as the resistance in the main circuit has decreased by the approach of the carbons, the electro-magnet in the circuit will regain its superior attraction and return the oscillating bar to its original position. Adjustable stops are provided for limiting the motions of the locking bar.

5303. "Telephones." Isaac Burton. Dated December 5. 2d. This invention consists in the construction and use of what the inventor calls an "anti-induction diaphragm" between the end of the telephone magnet and the metallic diaphragm at present in use in the instruments employed for telephonic communication, the object of the invention being to decrease the induction and thus to prevent the sound or voices from other wires being heard by the operator. The "anti-induction diaphragm" consists of a disc or discs of paper, parchment, papier maché, or other suitable material (of a smaller diameter than the ordinary metallic diaphragm) placed between the latter and the end of the telephone magnet. (*Provisional only.*)

5316. "Apparatus for lighting railway carriages, &c., by electricity." R. Laybourne. Dated December 5. 6d. Relates to an improved arrangement and combination of apparatus employed for lighting railway and other carriages and trains by electricity. For this purpose the inventor mounts or affixes a dynamo-electric machine so that it may be driven by the wheels or axles of the engine, tender, or carriage of a train or other vehicle by means of bands or straps and pulleys, or by toothed wheels, or by friction pulleys actuated by the tyres of the wheels, or by other motive power carried thereon, the current of electricity derived from such dynamo-electric machine being employed to charge or maintain the force of a series of Faure's accumulator batteries (or any other suitable accumulator capable of storing electricity), such accumulator being carried by the train or carriage.

5322. "Electric accumulators." J. Imray. (A communication from abroad by Jules Carpentier and Dr. Oscar de Pezzer, both of Paris.) Dated December 6. 2d. In electric accumulators in which equal surfaces of lead are employed the negative plate has formed on it a suboxide such as Pb^2O and when this plate is fully oxidised there still remains on the positive plate a peroxide such as PbO^2 unreduced, and consequently useless. In order to lighten and simplify the accumulator its plates are, according to this invention, so proportioned in thickness and surface that useless material is avoided and more complete and uniform action is insured. For this purpose the negative plate, is made very thin and the positive plate has about twice the thickness and about half the surface area of the negative plate. Each plate, instead of being made in one piece, consists of a number of blades bent double and placed side by side within a porous cell of retangular shape, all the blades of a cell being soldered to a conducting wire or bar at the top. (*Provisional only.*)

5338. "Secondary batteries." Desmond Gerald FitzGerald, C. H. W. Biggs and W. W. Beaumont. Dated December 6. 6d. Relates to the production of the plates or electrodes employed in secondary batteries. It is necessary that these plates should expose large surface to contact with the electrolyte, as for instance by being made porous or by multiple folding. One part of the invention consists in making these plates by drawing sheets of lead between two flat surfaces of wood or metal, one of which would have a reciprocating motion of small range, and be provided with a number of fixed points, such as pin or needle points, disposed in such a manner as to finely perforate the sheet of lead which would de drawn at the necessary speed between the two surfaces, so that the perforations should be closely contiguous. The points or punches may be disposed so as to occupy intersecting points made by lines drawn parallel to each other, and traversed by other parallel lines at a certain angle thereto. After perforation these plates are oxidised or chemically treated, so as to prevent metallic union when being mechanically manipulated, as herein further set forth. With this in view the inventors prefer to immerse the perforated plates in dilute sulphuric acid contained in a vessel from which air may be withdrawn, the object of this being to fill the perforations with a fluid capable of acting superficially upon the metal, so as to produce for instance a coating of lead sulphate within the perforations.

5360. "Telephone transmitters." E. H. Johnson. Dated December 7. 2d. According to this invention the inventor uses an electrode made from a metal of high specific resistance, such as tellurium, boron, or silicon in combination with a diaphragm, the primary wires of an induction coil and a cell of battery or other source of electric energy, which combination constitutes a telephone transmitter, possessing certain important and valuable advantages over other telephone transmitters. The inventor has found by experiment that when the metal used forms part of a low resistance circuit, a slight variation of pressure between it and an electrode of similar or dissimilar metal will produce a corresponding variation of the resistance of the circuit, and consequently a variable strength of electric energy sufficient to actuate the diaphragm of a telephone receiver, and that a variation quite sufficient for the purpose of transmission of speech so as to render it distinctly audible in the receiver may be had without producing an actual break of the circuit by a separation of the electrodes.

5385. "Telephones, &c." G. W. Foster. Dated December 9. 6d. Consists of a telephone handle or case furnished with an exterior groove or recess for the reception of a helix or coil, also with a hole for the reception of a magnet, and two holes bored at an angle for the reception of telephone cords. Also of a permanent magnet fashioned with a screw cut head and a fixed metallic screw cut adjustment collar, whereby said magnet can be fixed and adjusted to its proper position with reference to the diaphragm of a telephone. Also of a combined lightning arrester and binding post device, consisting of two or more metallic pieces arranged in a ring shape provided with threaded connections for holding the contact points of telephone cords, and suitably connected with the ends of the telephone or other helix, said metallic pieces being fashioned with teeth or corrugations on their surfaces and placed near to one another. Also of a telephone constructed of two metallic plates, each fashioned with a contact shoulder for receiving a diaphragm, and placed shoulder to shoulder for holding the diaphragm and forming an air chamber, said diaphragm being insulated from either or both of the plates, and said plates being provided with hinges and made to form a door or cover to a receptacle for holding an induction coil or other matters. The plates being used as conductors of electricity and to complete the primary circuit of the telephone. Also of a telephone transmitter consisting of a spiral spring fastened to a diaphragm at one end and a pin at the other, in combination with a suitable electrode held in a cap supported by a pressure spring, said spring being attached to an insulator by a screw at one end and to the cap at the other by a screw nut, together with a screw for governing the pressure of the electrode against the pin. Lastly, of the insulator for insulating the primary conducting wire from the inner metallic plate.

CITY NOTES.

Old Broad Street.

SOUTH AFRICAN BRUSH ELECTRIC LIGHT AND POWER COMPANY (LIMITED).

On Monday last the first ordinary general meeting of the above company was held in Cannon Street Hotel, which was preceded by an extraordinary general meeting, held for the purpose of confirming a special resolution passed at a previous meeting of the company on June 19th last. Colonel George Coxon, chairman of the company, presided.

The secretary, Mr. Thomas J. Seel, having read the notice convening the meeting, the resolution, which was as follows, was taken as read:—

"That the articles of association be altered in manner following, that is to say:—

"The following article shall be substituted for article 71, viz.:—

"71.—The office of director shall be vacated—

"(1) If he become bankrupt, or liquidating debtor, or lunatic, or compound with his creditors.

"(2) If he ceases to hold the requisite share qualification.

"(3) If he absents himself from the meetings of the board, without leave of the board, for a period of three consecutive months at any time.

"Any director (whether an ordinary director or a managing director) who otherwise than as a member or director of an incorporated company, is concerned in or participates in the profits of any contract or transaction with the company, or is entitled to any interest in any property about to be purchased or taken on lease by the company, shall at or before the time when such contract, purchase, or transaction shall be entered into or agreed to on behalf of the company, disclose the nature and extent of his interest in any such intended contract, transaction, or property, and thereupon a memorandum to that effect shall be entered in the directors' minute book. In default of such disclosure being duly made when and as required (but not otherwise) a director shall be held to be a trustee for the company to the extent of any profit or emolument he may have or obtain under or by reason of any such contract or transaction, or by reason of any such purchase or lease, and if such director be the sole person interested in such contract or transaction, or in the property purchased, or taken on lease, the contract or transaction, or purchase, or lease may be set aside at the option of the company. A director who is concerned in or participates in the profits of any such contract or transaction, shall not vote in respect thereof, notwithstanding that his interest is merely that of a member or director of an incorporated company, or that he has duly declared his interest, and if he does so vote, his vote shall not be counted."

The Chairman stated that the sole object of the extraordinary meeting was to confirm the above resolution, and moved its confirmation in the usual terms.

Mr. C. E. Atkinson seconded the motion, which was put to the meeting and carried unanimously.

The Chairmain: Gentlemen, that finishes the business of the extraordinary meeting. The second paragraph of your notice is with reference to the first general meeting of the company which I have now the honour to open. On the last occasion when we met there were certain queries put to us—rather prematurely we thought, considering the company was only just started—and we intimated that on this occasion we would be more prepared and ready to give any information with regard to the position, progress, operations, and prospects of the company than we were then prepared to do. In pursuance of that engagement, I will, with your permission, read you a few notes which I have made on the position of our company, because we consider ourselves, as representatives of the shareholders of this company, as custodians of their interests, and that therefore we hold we ought to have everything in common with them, and to retain nothing from them with which they should be made acquainted. Of course there are certain matters with regard to terms of contracts that you will understand, as men of business, it would be absurd to expect to be published; that it should not be published to the whole world any more than that any one of you in business would think it wise to publish his terms of contracts to the world. But any shareholder who wishes full information can have access to the books at any time, and Mr. Seel, our secretary, will be always glad to give any information to any shareholder who may wish for it. This company was registered on May 13th last, and it will be no doubt satisfactory to you if I say a few words with regard to its position and prospects. The shareholders will remember that in 1881 Messrs. Blane and Macdonald acquired from the Anglo-American Brush Electric Corporation, Limited, a licence to use in South Africa the Brush system of electric lighting. They sent to the Cape Mr. Donald Macdonald, now our Colonial manager, and also purchased and forwarded to South Africa some engines, dynamo machines, and plant. The company acquired from them not only the concession for the use of the Brush system, but also the plant in the colony and in transit and the benefit of the contracts under negotiations which had been opened or were in course of being arranged. The shareholders will be aware that a company starting new business such as ours will necessarily have to spend money in experiment and in temporary installations; and the negotiations which had made most progress at the time of the company's incorporation related to the lighting of Kimberley. So long ago as October last our manager reported that since his arrival he had seen several members of the Town Council on the subject of lighting the town, and from what had transpired there was every prospect of securing a good contract. From time to time he reported the progress made in the negotiations for the contract, and in January last he reported that he trusted soon to be able to state that a contract had been secured. I give you, gentlemen, merely extracts from his letters bearing upon this point, and all the extracts that I shall read are simply those that bear upon that point. The others refer to the general business of the company. In February he reported that experimental lights had been started, that is, in Kimberley, and that he was pushing on the final arrangements with the council. On the 2nd of March he reported that the lights had been going on steadily, and they had given general satisfaction, and he goes on to say that he was negotiating for their permanent installation, and that the difficulty—I beg to call your attention to this—which stood in the way of making the contract was that the lighting rate was not to exceed 1d. in the £, which was not sufficient to produce enough to provide sufficient remuneration for installing and working thirty-two lamps required to light the town. And it is an important fact that at that meeting an addition of £3,000 was made to the rates for the purpose of increasing the funds in hand for the lighting rate. That is, an additional £3,000 raised by the corporation with a view to lighting the town with electric light. The whole thing may have to be submitted again to the ratepayers. Later on in the same month Mr. Macdonald informed us that a meeting of ratepayers would immediately be called, and that he thought his final proposal would be accepted. On the 11th of May, two days before the company was registered, a telegram was received here; it ran as follows:—"Have made a contract for Kimberley." It was, therefore, very gratifying to the directors to be able to announce in their prospectus that a telegram had been received; that is, that the contract had been completed with the Mayor of the town of Kimberley to light the town with the Brush system on terms which the directors believed would prove highly remunerative. Our manager communicated to the directors the rate of the proposed contract as agreed to by the Town Council. The directors did not consider it would be advisable in the interests of the company to make public the terms of this contract. But they consider them satisfactory in all respects, and negotiations are still going on with every prospect of ultimate success. With reference to the Kimberley contract, the directors have to add that, although it has been approved, and the resolution to seal it signed by the Town Council, a minority of the ratepayers (the majority have voted in its favour), interested from other motives, are still endeavouring to prevent its being carried into effect, and have gone so far as to commence proceedings to restrain the council; that is, to restrain the Town Council, in the person of their mayor, from signing the contract, on the ground that the corporation, as at present constituted, is not a legal body because the voters' list for the present year has not been made up. With reference to this hitch our manager writes: "I am in no way anxious as to the result; but some further delay will be involved, as in all important cases appeal is made from the High Court of Griqualand West to the Supreme Court of Cape Town; and in the meantime the work has been proceeded with." New plant is on the way, and the work is being pushed on in order to complete the contract. The directors cannot but think that the public feeling in Kimberley will be too strong for the opposition, and that matters will go forward presently more smoothly than at present. Concurrently with these negotiations our manager, to whose zeal, untiring energy, and great ability, we hope one day to point as the chief factor in the success of the company, had been negotiating for the lighting of the Cape Town docks, harbour, and railway station, and has, we are happy to report, brought his negotiations to a successful issue. On May 2nd he writes with reference to the experimental installation in the Cape Town docks, the lamps have worked perfectly since I wrote on the 6th ult., and without interruption, "and that it was probable that he would be asked to submit an estimate for lighting the outskirts of the town," where the gas company, whose contract has been continued for another year, has refused to lay their mains, owing to the small number of lights required. On May 30 he wrote:—"Lights in the dock are giving every satisfaction, and I have reason to believe that they will be permanently established." Further on he adds: "Lights are working well in the dock over thirteen hours per night," but the Board have yet come to no decision. The engineer informs me that the only hesitation on the part of the commissioners is their want of perfect assurance that the Brush system is the best; but he has been able to satisfy them that it is the cheapest. That, I may say, is the government engineer, not our representative; and I think there is little doubt the light will be adopted. He adds: "The new company should, I think, work up incandescent lighting for uses which would open a larger field for lighting in all interior towns where gas is beyond reach. On the 9th of June he wrote that if the Kimberley mining board did not undertake the lighting of the mines, the company will certainly light their own works; and that it is from this source that he anticipates our chief business from the fields; but owing to the extreme depression now prevailing it may take some time to develop this branch of our business. Again he writes: "You will see from the copy of the *Port Elizabeth Herald* that permission has been obtained from the Town Council of the town to exhibit a set of lamps in the streets. Not very long ago the Port Elizabeth Council refused to have anything to say to the light—I suppose they like the look of it." In the same letter he intimates that he has addressed letters to the Government and Table Bay Harbour Board, stating that it is the intention of this compauy to establish in Cape Town a general electric business, and that they are prepared to enter into contracts for lights at fixed rates per light per annum, to be worked by our own men and at our own risk. On the 4th of this month we received the following satisfactory telegram, which comes well after these negotiations by our manager:—"Dock Railway agreed; sail to-day;" which points to the final conclusion with the dock and railway. "Sail to-day" means this: We thought as soon as our company was formed that there were a good many matters that could better be discussed personally with our manager—whose very extensive experience and knowledge of all the fields of future operations in the Cape are quite of exceptional value—that his presence here would be more satisfactory and would enable us to see our bearings a little better. Our manager spoke in one of the letters which I have read of the necessity of incandescent lighting. I refer back to that to explain this telegram, because, with reference to the extract of the letter of May 23rd, prior to the formation of this company, Mr. Alexander Macdonald, of Blane, Macdonald, and Company, had been granted the refusal of the patents for South Africa held by the Electric Storage and Force Company — the Sellon-Volckmar accumulator—on exceptionally favourable terms. I may add, what may not be generally known, that we may now say the Sellon-Volckmar and Faure accumulator, because this company has absorbed the patents of Mr. Faure as well as the well-known patents of Sellon and Volckmar. In fact, they cover now all the patents that can be applicable to what we may look upon as the groundwork of all future electrical operations. Our agent alludes to the question of lighting solely; but I need not tell you that the facilities for lighting given by this valuable accumulator are only a small part —certainly only a part—of the immense power and advantages we shall possess by holding this patent, in the matter of tramcars and force for machinery, in fact, force as well as light. The directors were enabled, through the good offices of Mr. Alexander Macdonald, to open negotiations with the Electric Storage Company, which resulted in acquiring these patents on the same favourable terms. They are exceptionally favourable, and we are very fortunate to be in the position to be able to tell you that we are, in so far as that goes, holders of exclusive rights of the Brush system and of the Sellon-Volckmar accumulator system, and so far, are masters of the situation. One matter in the course of ordinary business, and the only one that calls for our attention, is the confirmation of the appointment of Messrs. Deloitte and Dever as auditors of the company, which, therefore, I beg to propose.

Mr. Lloyd seconded the motion, which was carried unanimously.

The Chairman: That completes then our business at this meeting, and I am very much obliged for your attendance.

In reply to a shareholder, who asked whether it was the intention of the company to apply for a Stock Exchange quotation,

The Chairman said they had applied. They could not possibly get a quotation till this clause of the Articles of Association were altered, and it was in order to qualify them for this quotation that an extraordinary meeting had been called to-day.

On the motion of Mr. Edmund Hornsby, seconded by Mr. Dickson, a vote of thanks to the Chairman was carried by acclamation, to which the Chairman briefly responded, and the proceedings terminated.

THE ELECTRIC LIGHT AND POWER GENERATOR COMPANY, LIMITED.

An extraordinary general meeting of the shareholders of the above company was held on Friday, the 14th inst., at the company's offices, 47, Cannon Street, Admiral E. A. Inglefield presiding.

The secretary, Mr. F. H. Landon, read the notice convening the meeting, which stated that the purpose of the meeting was to confirm the following special resolution which was duly passed at an extraordinary general meeting of the members of the company held on the 27th ultimo: "That the name of the company be changed to 'The Maxim-Weston Electric Company, Limited.'"

The Chairman said: That, gentlemen, is all the business before us to-day. Some little misapprehension, however, has arisen with regard to a paragraph, as printed, of my speech at the general meeting of the company, and I think this a favourable opportunity—I won't say of qualifying, but of explaining what I then said. I told you we were in negotiation for selling concessions to a very large amount, that we were also engaged about some very favourable contracts which we were very hopeful would yield large profits. I should like to qualify it by saying that it should be stated that the contracts are not quite independent in themselves; they were dependent upon one of the concessions in progress of negotiation, which he had previously mentioned. If the contracts, as well as the concessions, were completed, the contracts would be made over to the concessionaires under certain terms. If the concession were not carried out and the contracts were, the latter would be worked by this company on profitable terms. I think this misunderstanding it is desirable to correct. It is no actual alteration of the facts—but it must be understood that the contracts must be looked to first and the concessions afterwards; for if none of the concessions were carried the contracts could be worked, though, of course, in one case the profits of the company would be larger than in the other.

Mr. Russell asked what proceedings would be taken to make it clear that under the new name the company would still be the same?

The Chairman said that in contracts, and so on, the new name would be employed with the old name in brackets, so that there might be no misunderstanding. They required, he might add, permission from the Board of Trade before the shares could be issued under the new title. They expected that to be done within a fortnight. The Chairman, continuing, stated that they had at the Reading show, which was then taking place, an exhibition of their system, which was visited by 20,000 people. He might also read to the meeting, from a paper read by Mr. Sugg before the Gas Institute in June last, the following comparison of lights from tests made:—Jablochkoff system, 114 candles; Brush, 557; Weston, 1,466. To this latter figure the author added, "This is the most powerful light I have yet tested."

Colonel Gilbey said that statements had been made that the Brush was the cheapest system, but when they took into consideration the fact that this company's system supplied such a much greater illuminating power, they could claim economy as well as efficiency. He believed that wherever their lights were shown they extinguished everything else.

The Chairman said that that was all their business. He might just add that companies such as theirs were not to be judged by the market price of the shares. With all these mushroom companies—for he could not but think that many of them were mushroom companies—starting up around them, he could easily understand that people were a little perplexed as to what was to be the light of the future. He thought that their light would stand the test of any comparison. At Reading, where their exhibition took place, he believed that another company's exhibits—he would not mention its name—were quite thrown into the shade by the Weston lights.

In reply to Mr. Griffiths, the Chairman said that the new title would be impressed in the articles of association, and upon their prospectuses wherever their name occurred.

A vote of thanks to the Chairman was moved by Mr. G. Russell, seconded by Mr. Griffiths, and carried unanimously, and the proceedings then terminated.

ANGLO-AMERICAN BRUSH ELECTRIC LIGHT AND POWER COMPANY (LIMITED).

A special meeting of the above company was held on Tuesday last in the City Terminus Hotel, Cannon Street, Sir Henry Tyler, M.P., chairman of the company, presiding. The secretary read the notice convening the meeting, which stated that the following resolution would be proposed: "That the 85th of the Articles of Association be repealed, and that in lieu thereof the following be henceforth the 85th of such articles:—'85. The directors may, from time to time, of their own authority, pay to the members in proportion to the amounts paid up, or credited as paid up, on the shares held by them respectively, such bonus and such interim dividends as in the judgment of the directors the position of the corporation justifies.'"

The Chairman said: We have asked you, gentlemen, to be good enough to meet us here to-day in order to get us out of a little difficulty. That difficulty is rather a serious one, and, as far as I am aware, it is an unprecedented one. But the fact is we have a good deal of money now, and we wish to distribute it amongst you, and we are unfortunately precluded by our articles of association from so distributing it. Now these articles of association are, of course, our law; we are entirely bound by them, and it is only on our personal responsibility that we can depart from them. The amount we wish to distribute amongst you we have arrived at this morning after looking through all the figures of the company, so far as we are able to make them out at the present time. You are aware that under the 91st article, on page 29 of the Articles of Association, the true financial statement of the corporation and general balance-sheet are to be made out as on the 31st December, so far as the business of the corporation will admit, and should be laid before each ordinary general meeting after the first general meeting. So far, you see, we can only make our accounts and have our ordinary general meeting once a year. We have not thought it at all worth while to go through the process of taking stock, as we would have to do in making up our accounts at the end of each year, but we have prepared a rough balance-sheet to satisfy ourselves as to the amount which it is desirable to distribute, if you are good enough to give us permission to do so, and in that way we have arrived at the sum of £245,000 that we have to pay to you whenever you like to receive it, and we propose, with your permission, that it shall be paid to you in the middle of August. In order to do that we must alter Article 85 of the Articles of Association which says, "That the directors may on their own authority once in every year pay to the members a sum on account of the dividends not exceeding a rate of 10 per cent. on their respective shares." It is quite clear that the legal gentleman who drew that article, as well as the directors who sit before you, had no idea when this company was incorporated what success it was likely to meet with. (Hear, hear.) And therefore we were precluded by that, and we precluded ourselves, from paying more in the way of interim dividends than 10 per cent. per annum on the respective shares. That I take to be the meaning of this clause. Having, as you will see, the sum of £245,000 to distribute at present amongst you—and that, I may say, is entirely out of the profits in this undertaking—we are obliged to ask you to allow us to alter this article of association, and we have done so, merely repeating what was said in the previous article, that the entire net profits of the corporation shall belong to the holders of the shares of the corporation—I think you will admit that this is sound doctrine—and shall be divided among all the shares of the capital of the corporation for the time being issued and fully paid up, or deemed and taken as fully paid up; and in case of any of the shares not being fully paid up, then in respect to such shares in proportion to the amount of all calls then paid on such shares. Now, you will see in the resolution we have put before you to-day and in the individual article which we propose to alter, we have carried out the proposal as prescribed in the 84th article which I have just read to you, and therefore our resolution to-day is "that the directors may from time to time, on their own authority, pay to the directors in proportion to the amounts paid up or credited to be paid up"—the very words of the previous article—"on the shares held by them respectively, such bonuses and such interim dividends as in the judgment of the directors the position of the corporation justifies." We consider after having looked through the figures this morning that our position justifies our dividing amongst you this sum of £245,000, and we therefore recommend you to pass this resolution in order to enable us to distribute it amongst you about the middle of August. I beg to move the resolution I have just read.

Mr. Sellon said: Gentlemen, I beg to second the resolution which our chairman has so well put before you. He has fully explained to you the reasons which make it desirable that this resolution should be carried, and therefore it is quite unnecessary that I should amplify upon those reasons. I simply beg to second the resolution, and I hope it will be your pleasure to accept it.

Mr. Isaac said that if he understood rightly, the money which it was proposed to divide amongst the shareholders as a bonus had arisen from the sale of licences which had been given to other companies. He would suggest that instead of distributing the money as bonus it should be put to account as capital. That would make no difference as to the amount to be divided, but it would as to the nature of the payment itself. He did not think but that the fully paid up shares, and those in which only £4 had been paid up, would eventually become of the same value, and that they would be able to divide their dividends without the use of any capital at all. But if they divided this money as a bonus, the fully paid up shares and those on which £4 had been paid up would remain always at the same relative value. He would, therefore, propose that the money proposed to be distributed as a bonus should be distributed *pro ratâ* on capital.

The Chairman: Do you move that, because that is hardly in order as an amendment? This is merely a proposition for the rejection of certain words in the Articles of Association and the substitution of others. I have not asked liberty to divide any money at all.

Mr. Isaac said he would put it in this form: "That the proposed resolution be modified to this extent, 'The directors may from time to time, of their own authority, pay to the members, in proportion to the amounts paid up or credited as paid up on the shares held by them respectively, such return of capital (instead of "such bonus and such interim dividends") as in the judgment of the directors the position of the corporation justifies.'"

Mr. Abbott said that as no one had risen to second the amendment it was a true estimate of the opinion of this meeting to say that they quite agreed with the resolution proposed. He himself quite agreed with the proposal of the Board for this reason, that the mover of the amendment was under a decidedly wrong impression in supposing that this company parted with any valuable portion of its property through having granted licences or concessions either in any part of this country or abroad. In these concessions—he should be glad to be corrected if he was wrong—all that they had parted with was the licence to develop the Brush system in various parts of Europe. At the same time they formed a very valuable adjunct, seeing that the company manufactured all the material which these subsidiary companies employed, and they had therefore in them a very valuable outlet for the commodity in which they dealt without any increase in their capital. So far as he understood it they were establishing really a goodwill on a going business, and a profitable goodwill which would rather increase the value of the capital which remained; but in order to still further increase it, it was desirable to have as large an addition to the reserve fund as possible. This alone would give them the command of the market among the electric light companies. He looked with very considerable jealousy on a proposal that the capital already subscribed should be returned, when it was in this company so very profitably employed. It had been the fashion of various companies from time to time and at periods of great prosperity, to reduce their capital.

It was done in the case of the Telegraph Construction Company, a favourite company with him at the time. When a large sum of money was made, the directors wisely said, "This is exceptional;" and they wrote down their plant, machinery, and *goodwill*—let them mark that; and returned that money to the extent of £8 a share to the proprietors. But it seemed to him, that in the case of this company exactly the reverse had taken place. They had got an increase in the value of that goodwill, and therefore in common sense they could not possibly write it down. He therefore trusted that they would not be led away by such proposals as that made by the proprietary to-day. He commended the board for dividing £245,000 amongst the shareholders, presuming before they arrived at the figure that they had taken good care to make ample provision for the future, to write down the goodwill of the business, or rather the patent rights and the machinery, and so on, which were always deteriorating; but certainly there could be no justification for writing down the goodwill of a business which seemed to be steadily on the increase.

Mr. Stewart inquired whether the directors were justified in allowing a portion of the proprietors to pay the sum of £10 without giving the same option to all the proprietors, a great number of whom were only called upon to pay £4. If the answer was that there was no distinct justification for the step, he had an amendment to the original resolution to propose.

The Chairman: May I ask whether the speaker is an original proprietor, or not? because if he is, he would know the facts of the case. When we started this company in the first instance, nobody believed in its success, and not many were much inclined to put money into it at all; and when we issued the prospectus and asked for our capital we had some difficulty in getting what we wanted, and we did then invite all proprietors to pay up in full. We not only gave them the opportunity, but made the request to do so, and urged upon them to do it. Therefore every proprietor had then the opportunity of paying up his shares in full. But I should like to tell you the whole story. Some proprietors, believing in the success of this company, did so, and they held now £10 paid up shares. Then, again, one gentleman in particular, I remember, came to the secretary having shares on which £4 had been paid, and thinking that they would go to a premium, was anxious to give a little more. We had got at the time money we called for, but that one gentleman sent to our former secretary who, under some misunderstanding, allowed him, after the shares were at a premium to go on paying up. That came before the directors. They were obliged to honour the engagement of their secretary, but finding what had been done, they put a stop to the operation, and nobody after that was allowed to pay up so as to make his £4 into £10 paid up shares. These are the exact facts of the case.

Mr. Brooksbank said that the gentleman who proposed the amendment was quite out of order, because the Board had not the power to reduce capital. It was *ultra vires*;- they could not do it. He rose to ask whether it was their intention to pay this bonus in a larger proportion to those gentlemen who had fully paid up shares than to those who had only paid £4 on their shares. It might not have been convenient for many gentlemen to pay up the money at the time the appeal from the Board was issued, and he thought it would be a case of great hardship if their case was not taken into consideration. Surely they would never propose to give a bonus of £10 to those who had paid their £10 on the shares, and only £4 to those who had paid only £4. Were they going to perpetuate that? He would put it to the sense of fairness on the part of the Board. It was under exceptional circumstances those £10 shares became so much more valuable, under circumstances which none could foresee. He left it confidently in the hands of the Board, feeling sure that strict justice would be done to the large body of the shareholders.

Mr. Henry Maudsley would like, if the chairman would inform the shareholders, to know what amount was placed to the reserve fund of this company.

The Chairman: Before coming into this room I told you we went into certain figures. Our object was not only to see what amount we could offer for distribution, but also what was left to represent the capital and the assets of the company, and in doing so we found there was a very large margin indeed representing the paid-up capital, and we ascertained what we had in hand and what we should retain after distributing this £245,000. We did so not so much on your account as on ours, because we said to ourselves, "We are not going to incur any liability in this matter." In asking the shareholders to receive what we had to divide as profits, we retain not only a large reserve fund, but a large margin beyond it. That is the position in which we come before you. With regard to what Mr. Brooksbank said, it is hardly an accidental circumstance whether a man subscribes £4 or £10 (hear, hear). It may depend upon the accident of how much money he has at that moment to put into the company, but that is the only accidental part about it. I think it was with great deliberation that the gentlemen would subscribe either £10 or £4, as they thought proper, when they were first offered the option of subscribing either the one or the other. It is our desire to do even justice to everybody. I should be sorry to wrong any man. One or two gentlemen representing holders of the £4 paid shares have spoken very nicely their opinions, but we have heard nothing from the £10 paid shareholders; for this reason I think that there is no proposal before us which would do them any injustice; I am quite sure, however, that if we gave the holders of the £4 paid shares a part of this distribution in a larger proportion than they had subscribed, we should have a tremendous outcry from the £10 holders; the only thing we could do was to alter the articles of association. Article 4 says distinctly that the entire net profits of the corporation should belong to the holders of the shares of the corporation for the time being issued, or fully paid up, or deemed and taken as fully paid up, and in respect of such shares in proportion to the amount of all calls then paid on such shares. Of course these articles were not drawn up with a view of this latter state of things, the gentlemen who drew them up never contemplated what has since happened. But here are the articles by which we are bound. We have no choice in the matter. We cannot offer a certain sum to the £10 holders and another to the £4, but we must pay every holder in proportion, and that really seems common sense, on the face of it, especially when everybody had the option to begin with of subscribing either £10 or £4. Therefore, since the amendment has not been seconded, I shall ask you to pass the resolution unanimously.

Mr. Isaac would wish it to be distinctly understood that he had never suggested that the larger proportion of the division should be given to the £4 paid shareholders than to the £10. He would not like it to go forth that he had done anything so unjust.

The Chairman said he had done it in an indirect manner. He would now put the resolution. He might mention that he had a large amount of proxies, but he was quite sure it would not be necessary to use them.

Mr. Brooksbank: I have not had a satisfactory——

The Chairman: You are quite out of order, sir.

Mr. Brooksbank: Then if I cannot obtain information I shall feel it my duty to demand a poll.

The Chairman then put the resolution to the meeting and declared it carried with two dissentients.

Mr. Brooksbank: You have not proved the articles of association infallible, because you have moved an amendment to them. I contend that it is most grossly unjust—(hisses)—that those gentlemen who have paid £10 simply should have a larger share of the dividend than the other shareholders.

The Chairman: That closes the business of the meeting.

On the motion of Mr. Maudsley the usual vote of thanks to the chairman was carried unanimously, to which the chairman briefly responded, and the proceedings terminated.

THE CUBA SUBMARINE TELEGRAPH COMPANY, LIMITED.

ON Wednesday, at the company's offices, 61, Old Broad Street, the twenty-second ordinary general meeting of the above company was held, Mr. Thomas Hughes, Q.C., Chairman of the company, presiding.

After the notice convening the meeting had been read by the secretary, Mr. James Scott,

The Chairman said: Next comes the report and accounts, and I suppose you will, as usual, take them as read. So I will at once move that the report and accounts as submitted to you be read and adopted. The shareholders will have seen from the report that the half-year has been the most successful that the company has ever seen since its establishment. It will be, no doubt, satisfactory to them, as it has been to the board. The traffic receipts, which is the best test, as compared with the traffic receipts for the corresponding half-year of 1881, show an increase of £3,000, or very nearly so. Now, in respect to the distribution, the shareholders will see that again the board have thought it wise to carry a very considerable sum to the reserve fund. They are all aware—the shareholders who have attended these meetings—that this has been the policy of the board from the very commencement of the company, and that the board will not feel themselves in a thoroughly satisfactory condition, until the reserve fund reaches £50,000. They will be pleased to see that that amount is being very nearly reached, for the reserve fund now stands at £47,000. Then the shareholders will concur with the board in thinking that under the circumstances the dividend on the ordinary shares might be increased to 8 per cent. (hear, hear), and that is the recommendation which we shall lay before you for your assent. I do not think there is any other subject upon which I need trouble the shareholders further. They will have seen by the accounts that the expenses are practically the same, in fact, some £200 less than in the corresponding period of last year, although the business of the company has increased so largely. With respect to the question of the dispute with the Spanish Government the shareholders will see that everything has been done to bring that to a conclusion, and we trust that the result of the appeal will be to put us in a position of getting a return of that fund. This meeting will presently be converted into an extraordinary meeting, generally to deal with the question of auditors. Without trespassing upon your time any further, I will move that the report and accounts be received and adopted.

Mr. A. F. Low: I beg to second that.

Mr. Thos. Greenwood: I think we should recognise our improved position more fully than you, in your modesty, Mr. Chairman, have been good enough to put it. I think we should congratulate the board upon their successful management and ourselves upon our improved position, resulting from that management. We are now in a better position, so far as I am aware, than we ever were before. The proprietors may probably put figures together for themselves, but I can state that the earnings for the half-year have been 15 per cent. per annum. We pay 8 per cent. on the ordinary shares; have added £1,700 to our balance; £3,950 to our reserve fund, equal to 7 per cent.; and during the half-year we have earned and paid what is equal on the whole year to 7 per cent., and we have carried forward another 2 per cent. for the half-year, equal to one per cent. for the year, besides adding to our reserve fund £7,000, which stood at the beginning of the year £40,000, and at the end £47,000, which is equal to a 30th part of the whole capital of the company. This satisfactory condition is not to be exceeded by any telegraph company in existence. The only thing that has struck me as singular is that the company should still be burdened by that 10 per cent. per annum upon preference shares. I do not complain of the terms upon which those shares were issued. But now we have improved our position so much, and are in addition to all I have stated, practically purchasing a new cable out of revenue, I think the time has arrived when we should consider whether it is not possible to place ourselves in a better position with regard to preference shares. I think it would be worth while to consider the issue of £100,000 of 6 per cent. preference capital in £10 shares, and that those shares should be convertible into ordinary shares, within a limited period at option of the holders, and failing that they should be redeemable by the company at par; that for every share held by the preference shareholders they should be entitled to one ordinary share in the company, and a bonus in cash. Another mode would be to authorise the board to invest some of our reserve in the purchase of preference shares when the market is suitable.

Mr. Newton asked whether there was any prospect of a communication with the Western Brazilian, so as to increase their connection with Cuba; and he would also like to know whether the board had any information as to the threatened competition by Mr. Jay-Gould. With reference to the issue of capital to take the place of the existing 10 per cent. preference, he did not think it possible to alter the conditions of that issue. Mr. Greenwood had thrown out the idea that they could use the capital to purchase. They could not do that. The Court of Chancery would not sanction that. For his own part, he always had a grievance against the company, for when they received notice in half-penny wrappers they were put on one side, whereas if under a penny stamp would be taken notice of.

The Chairman: Well, gentlemen, with regard to the question that has been asked, so far as we are aware the Brazilian communication is not likely to be carried out; I trust it may be in the future; and of course, as Mr. Newton has said, whenever it is carried out it will be a source of great profit to this company undoubtedly. With reference to the other competition which was threatened some time back, so far as we are advised it is for the present entirely gone off. This is also satisfactory for this company. Now comes the only other question raised—the 10 per cent. preference shares. The last speaker has stated that it is out of the question that power should be obtained. It was suggested by Mr. Greenwood, as an alternative, to buy up those preference shares. He has stated that so confidently that there may be some recent decision in the Court of Chancery, of which I am unaware, which makes it quite out of the question that such an alteration should be allowed in a company of this kind. We have no power at present, so to purchase the preference share I for my part believe it to be by far the best way of dealing with them. I think that to-day we should, seeing the feeling that exists amongst the shareholders, for every speaker has referred to it and placed it in the position which the board has, consider that very carefully, whether we cannot so modify the articles of association as to obtain power to invest our surplus capital in the purchase of those preference shares. I am not quite sanguine as to the result, but if not we must consider one of the other two ways which have been proposed to us. I now, therefore, simply beg to move the adoption of the report.

Mr. Griffiths said that some time since he was consulted by a tramway company, and that matter was taken before the Master of the Rolls, and he decided that the preference shares are a prior mortgage on the company. It was the case of Dent *v.* The London Tramways Company. They must deal with every shareholder individually.

Mr. Newton said that the West Indian and Panama had similar shares to this company, but they succeeded in doing what Mr. Greenwood had suggested. They were obliged to meet those who did not acquiesce, and these persons got all that they asked for.

The motion for the adoption of the report and a resolution that a dividend be declared at the rate of 10 per cent. on the preference shares and at the rate of 8 per cent. on the ordinary shares for the half year were then put and carried unanimously.

The Chairman then announced that Alexander F. Low, Esq., was a retiring director, and he now proposed his re-election.

Mr. Griffiths seconded.

The Chairman: With reference to the auditor, I think I need not say anything on this subject. This, however, I am bound to say: we have had a new eye upon the accounts, and I think I may say, that the impression of the board is that they have a very able and deeply interested auditor to control in future the accounts of the company, in Mr. Thos. Greenwood, who now retires and offers himself for re-election.

Mr. W. A. Hooper proposed the re-election of Mr. Greenwood.

Mr. Cochrane seconded.

Mr. Griffiths said this was an adjourned discussion of what took place three months ago. He did not want to create any dissension in this family (laughter). Mr. Cowan had left this transitory state of mundane affairs, and he would pay his tribute of respect to him as well as to Mr. Brand. The view he took at the last meeting with reference to the question before them was that it would be better for them to have two auditors instead of one, because good book keeping was necessary and exceedingly valuable, and secondly, because it would tend to raise their company in the estimation of the public. While he admitted that they were very prosperous at the present time, their past history shows that that was not always the case. The National Ocean Telegraph Company had had disputes with them, the West Indian and Panama Company had also had disputes with them, and that kind of thing must tend to loss of reputation with the public. He thought there was some reason why the public did not invest more in their shares, and why the market value was not equal to their intrinsic worth. The public must have some difficulty, however, in discerning what was good and what was bad. He did not think that anything which would increase their reputation with the public would be otherwise than wise and prudent. It was for that reason that he advocated that they should have two auditors instead of one; a single error might escape the one keen eye and be detected by the other keen eye. If they considered one auditor was sufficient guarantee, all well; but as a question of caution he thought it would be wise to incur a little additional expense that they might be sure themselves and make the public sure also.

The Chairman: The question before the shareholders is proposed and seconded, that Mr. Thomas Greenwood be the auditor of this company.

Mr. Greenwood said, as a copy of the report of this meeting would get into the hands of the absent shareholders, he should like to express to them and to the meeting his full appreciation of the reply to his circular which he sent to them. A very large proportion of the shareholders had been good enough to lodge proxies in relation to his re-election. Upon the question of the two auditors, he had only to say, that being committed by the circular to a certain line of duty, he was bound to fulfil it. Out of the many proxies with which he had been favoured, only twelve of the number had expressed views on the question of the two auditors; and of these, eight were in favour of two auditors, and four in favour of one. The question, however, must be put to the vote.

Mr. Newton asked what proportion these four votes bore to the number of circulars sent out. He had a strong opinion in favour of having two auditors.

The Chairman: The meeting is now converted into an extraordinary meeting, for the purpose of determining whether you will have two auditors. The proposal that will now be put before you will be that the present rule as to the electing of an auditor, in the event of a casual vacancy, be altered in the way you will see in the notice which has been distributed amongst you. We wish these words in Article 116 of the present regulations of the company cancelled—"If any casual vacancy occurs in the office of any auditor appointed by the company, the directors shall forthwith call an extraordinary general meeting for the purpose of supplying the same;" and the following substituted in the place thereof, "If any casual vacancy occurs in the office of auditor, the directors may appoint any shareholder or shareholders, or any accountant or firm of accountants, to audit the company's accounts, with such remuneration as the directors shall think proper, and at the next general meeting held after such vacancy the shareholders shall proceed to elect an auditor or auditors." We had to call an extraordinary general meeting a short time ago for the purpose of electing an auditor upon the death of Mr. Cowan. It was very common to place that resolution in the old articles of companies, but I think it would be a mistake to put it in articles drawn up at the present time. It must be most desirable not to have extraordinary meetings called simply for the purpose of supplying a casual vacancy in the auditorship.

Mr. Greenwood thought that it would be better, if the chairman had no objection, to continue the existing meeting and determine the question of a second auditor, and after determining that, and seeing whether the "Ayes" had it, then to proceed to the election of a second auditor.

Mr. Page: I second that.

The Solicitor: It has not been proposed yet.

Mr. Newton: Just to test the question I will move it.

Mr. Hooper remarked that one auditor had been sufficient for this company for the past twelve years, and he thought the proposal for a second seemed to indicate a want of confidence in the board of management, and in their new manager (no, no); that was the view he took of it. He therefore begged to move as an amendment, that one auditor was quite sufficient for such a small and simple statement of accounts as they had so clearly put before them from year to year. He did not think that the shareholders should use such language about confidence in the board as was generally done, and then on the first occasion that they had an opportunity of practically showing that confidence——

Mr. Newton: Mr. Chairman, I protest against that.

The Chairman: The shareholder has a right to express his views.

Mr. Cochrane would second the suggestion made, but on a totally different ground. He thought that it was better to put the responsibility on one man rather than to distribute it over others.

Mr. Newton had firmly expressed his opinion of confidence in the board, and had stated many times that the accounts were the clearest and most faithful of any telegraph company now before the public. He had not the slightest intention of raising any question of confidence in the board. He thought that was out of the question with a company paying 8 per cent. to its ordinary shareholders. The vote must be "Yes" or "No," for they could not put the amendment.

The Chairman: I do not consider the amendment irregular. Any shareholder has a right to put it in that form. The original proposition is that a second auditor be appointed.

Mr. Griffiths: In Parliamentary procedure a direct negative cannot be put as an amendment.

Mr. Greenwood: We shall not consider it an act of want of confidence in us if the shareholders have determined to have two auditors.

The amendment was then put, and the result was nine for and eight against.

Mr. Griffith repeated his previous remark that a direct negative was not an amendment.

Mr. Greenwood thought he should have some difficuly, because he could not record the proxies he held unless there were a poll.

The Chairman: The amendment is practically put as an original motion.

Mr. Hooper having withdrawn his amendment, hands were shown on the original motion—ten in favour and nine against.

Mr. Greenwood: I think I must demand a poll, but under compulsion.

A poll was then taken, when the numbers were for a second auditor, 28; against, 55.

The Chairman: That is taking the vote of the meeting without the board. The board, however, are of opinion that one auditor is sufficient.

Mr. Lindsay Scott (to the Chairman): Did you ever know of a board nominating an auditor?

The Chairman: Oh, yes; but in this case the suggestion came from the shareholders.

Mr. Newton could not see that much would be saved by the alteration.

Mr. Greenwood said he was present at the meeting when the suggestion for the proposed alteration of articles was made. Many of the shareholders were brought a long way to the meeting only six weeks before the half-yearly meeting six weeks later on. The shareholders then asked for the alteration; it was not for another body of shareholders to say whether they liked it or not. If a vacancy occurred, and they had only one auditor, and must have accounts presented, they must fill up the vacancy and put up with the inconvenience, or wait till the following meeting.

Mr. Lindsay Scott thought they did not need to alter an article to meet an emergency which might not occur once in fifty years. Mr. Greenwood looked like living many years yet (laughter).

Mr. Newton asked whether he would be irregular if he proposed an amendment that it was not necessary to alter the articles of association?

The Chairman said it was entirely their own question: the suggestion had come from the shareholders.

Mr. Griffiths thought that the expense of a second meeting to confirm the alterations, if agreed to, would be quite as great as calling a meeting to appoint a new auditor. The recent unfortunate necessity has only arisen once since the establishment of the company, twelve years ago. It seemed to him that it would be wise to leave things as they were.

Mr. Newton remarked that he thought the proposed alteration must fall to the ground.

There being no other remarks a unanimous vote of thanks to the Chairman was passed on the motion of Mr. Newton, and the proceedings terminated.

TELEGRAPH CONSTRUCTION AND MAINTENANCE COMPANY.

A HALF-YEARLY general meeting of this company was held on Tuesday last, 18th inst., at their offices, 38, Old Broad Street, Sir Daniel Gooch, Bart., M.P., Chairman of the company, presiding.

Mr. Shuter, the manager, having read the notice convening the meeting,

The Chairman said: Gentlemen, this is a meeting for the purpose of your asking questions rather than for any report from the board. We present no report or accounts, but I will state shortly the work which we have done during the past half year. We have manufactured about 1,000 miles of cable and laid about 550 miles of cable manufactured within the last year. We have also laid the German Union Cable between Emden and Valentia. That was completed in April by the *Scotia*. We have repaired the North Sea Cable, which is also now completed, and the *Kangaroo* has been twice to the Brazils to carry out the cable for the Western and Brazilian Company, and to repair the Brazilian submarine portions of the cable near Pernambuco. The *Scotia* has now been out about two months in the Atlantic repairing the Brest and St. Pierre Cable for the Anglo-American Company, and she recovered the cable in 1,940 fathoms of water in the Atlantic, and repaired that and put in 60 miles of new cable. She then went to repair the fault that has been for some time existing in the cable near Brest. That she is now engaged in doing. She has recovered the ends and buoyed them; but the weather has been so bad that she has not been able to put in the new piece. However, we hope that that will be completed as soon as we get two or three days of fine, calm weather. She will then go to the mid-Atlantic again to do some more repairs which are necessary there. It is a great thing to do to lift a cable which has been down twelve years in the mid-Atlantic, to repair it, and to put in a new piece, and to restore the cable. The cable taken out was in very fair condition—in fact, very good condition considering the length of time it had been down. But there were traces of defects which had taken place at short intervals of the cable from some chemical, no doubt, at the bottom of the sea. It does not continue far, but it is quite sufficient to create a weak point in the cable. We thought it almost more than we could expect to recover that cable and to repair it at such a depth of water after it had been down for such a long period. We are endeavouring to keep our works going by doing all we can to secure cable work. Having told you practically what we are doing I am afraid I have nothing to tell you as to the future. We are, of course, negotiating for work, and I hope that we shall be able to continue as we have hitherto done. I should be glad to answer any questions that any gentleman is inclined to put.

Mr. Ealing said: Is the 700 miles you have now of government contract work to be done in a hurry?

The Chairman: I do not know what you refer to.

Mr. Ealing: I only heard that, and I ask you the question.

The Chairman: We have not got a government contract.

Mr. Ealing: You had one.

The Chairman: We did have a contract. We have laid a cable of 900 miles in the middle of the half-year. Has any other shareholder any question to ask? There is no resolution to put. If there is no other question to ask I must declare the meeting at an end.

A vote of thanks to the Chairman for his conduct in the chair was then moved and seconded by two of the shareholders present, and carried unanimously. The Chairman shortly thanked the meeting for their confidence, and the proceedings terminated.

THE INDIA-RUBBER, GUTTA-PERCHA, AND TELEGRAPH WORKS COMPANY, LIMITED.—We are informed that the business of the Company for the past half-year has been satisfactory, and that the directors will, at the ensuing meeting, recommend the distribution of an interim dividend of 5 per cent., or 10s. per share, free of income-tax, payable on the 26th instant.

THE DIRECT UNITED STATES CABLE COMPANY, LIMITED.—At a meeting of the board, it has been resolved to recommend a final dividend of five shillings per share (free of income-tax), such dividend to be payable on and after the 16th August next, making, with the interim dividends already paid, five per cent. for the year ending 30th June last, carrying forward £282 16s. 8d., after having carried to the reserve fund £9,531 9s. 1d., making it up to £264,000.

OFFICIAL QUOTATION has been granted to the Pilsen, Joel, and General Electric Light Company, Limited."

APPLICATION FOR SETTLING DAY AND QUOTATION has been made to the Stock Exchange Committee on behalf of the "British Insulite Company, Limited."

THE UNITED TELEPHONE COMPANY.—The directors have decided to recommend, at the meeting to be held on the 1st. prox., a dividend of 5 per cent. on the share capital, subject to audit.

THE BRUSH ELECTRIC LIGHT AND POWER COMPANY OF SCOTLAND (LIMITED).—The directors have appointed Mr. F. M. Brockelbank as secretary to the company.

LATEST QUOTATIONS.

Authorised Issue.	Share.	Name.	Paid.	Closing Quotations. July 19.	Business Done.
		ELECTRIC LIGHT.			
40,000	10	Anglo-American Brush Co.	4	19½-20½	21.20.19¾.20¾ .20.19½.19.18½ .½.¼.19½.19.½.¾ 20.18 11/16
		Do. Do.	10	41 - 46	45.3.2.4.2½
30,000	5	Brush Electric Light & Power Co. (Scotland)	5	1¼- 1¾	
150,000	1	Electric Light and Power Generator Co.	1	½- ¾	⅝.11/16
25,000	5	Great Western Electric Light & Power Co.	2½	1¼- 1¾	
24,980	5	Hammond Electric Light & Power Supply Co.	2½	10½-11½	11.10⅞.½.¾.¼.⅛ .⅝.11.10½
40,000	5	Indian & Oriental Electrical Storage Works	2	2½-	
40,000	5	Pilsen, Joel & General Electric Light Co.	2	1 - 1½	
		TELEGRAPHS.			
2,116,400*l.*	Stk.	Anglo-American, Limited	100	49 - 50	49 xd.
2,441,800*l.*	Stk.	Do. Preferred } Def'd. receiving no div. until	100	79 -80	79½ xd.
2,441,800*l.*	Stk.	Do. Deferred } 6 p. c. has been paid to Pref.	100	19½- 20½	20
130,000	10	Brazilian Submarine, Limited	10	11¼- 11½	11¼.⅜.7/16
16,000	10	Cuba, Limited	10	9¾- 10¼	
6,000	10	Do. 10 per cent. Preference	10	16 - 17	
13,000	10	Direct Spanish, Limited	9	6¼- 6¾	
6,000	10	Do. 10 per cent. Preference	10	15½- 16½	
65,000	20	Direct United States Cable, Limited, 1877	20	11⅝- 11⅞	11½.¾
100,000*l.*	100	Do. 6 per cent. Debenture, repayable 1884	100	101 -104	
380,000	10	Eastern, Limited	10	10⅛- 10⅜	10⅛.3/16.1/16.3/16
70,000	10	Do. 6 per cent. Preference	10	13 - 13¼	
232,000*l.*	100	Do. 6 do. Debentures, repayable Oct. 1883	100	99 -102	
200,000*l.*	100	Do. 5 do. do. Aug. 1887	100	101 -104	
200,000*l.*	100	Do. 5 do. do. Aug. 1899	100	102 -107	
199,750	10	Eastern Extension, Australasia & China, Limited	10	11-11¼	11⅛.3/16.1/16- ⅛ xd.
320,000	100	Do. 6 p. c. Debentures, repayable Feb. 1891	100	107 -110	
500,000	100	Do. 5 p. c. (Australian Gov. Subsidy) Deb. 1900	100	102 -105	
140,000	100	Do. do. registered, repayable 1900	100	102 -105	
100,000*l.*	100	Do. 5 per cent. Debenture, 1890	100	102 -105	
254,300*l.*	100	Eastern and South African Limited 5 per cent. Mort. Deb. Registered redeemable 1 Jan. 1900	100	101 -104	
345,700*l.*	100	Do. do. do. To Bearer	100	101 -104	
22,050	10	German Union Telegraph and Trust, Limited	10	9¾- 10¼	
163,390	10	Globe Telegraph and Trust, Limited	10	6⅛- 6⅜	6⅜.¼.⅜
163,209	10	Do. 6 per cent. Preference	10	12¼- 12½	12⅝
125,000	10	Great Northern	10	12¼- 12¾	
100,000*l.*	100	Do. 5 per cent. Debentures	100	100 -103	
31,200	10	India-Rubber, Gutta-Percha and Telegraph Works	10	26 - 27	
100,000	100	Do. 6 per cent. Debentures, 1886	100	101 -105	
17,000	25	Indo-European, Limited	25	28 - 29	
38,148	10	London Platino-Brazilian, Limited	10	4½- 5	
12,000	10	Mediterranean Extension, Limited	10	2 - 2½	
8,200	10	Do. 8 per cent. Preference	10	8½- 9	
9,000	8	Reuter's, Limited	8	12¾- 13¼	
280,000	Stk.	Submarine	100	265 -275	
58,225	1	Do. Scrip	1	2⅜- 2⅝	
4,200	Cert.	Submarine Cables Trust	100	98 -103	
37,350	12	Telegraph Construction and Maintenance	12	28 - 29	
150,000	100	Do. 6 per cent, Bonds, 1884	100	102 -104	
186,750	5	Do. 2nd Bonus Trust Cert.	5	1½- 1¾	1½
30,000	10	West Coast of America, Limited	10	4¾- 5¼	
150,000	100	Do. 8 per cent. Debentures	..	..	
69,910	20	Western and Brazilian, Limited	20	7 - 7½	7
200,000*l.*	100	Do. 6 per cent. Debentures "A" 1910	100	107 -112	
2,500	100	Do. 6 p.c. Mort. Deb. series B of '80, red. Feb., 1910	100	99 -102	
1,500	$1,000	Western Union of U. S. 7 p.c. 1 Mort. (Building) Bds.	$1,000	123 -128	
1,030,000*l.*	100	Do. 6 per cent. Sterling Bonds	100	102 -105	
88,321	10	West India and Panama, Limited	10	1½- 1¾	
34,563	10	Do. 6 per cent. 1st Preference	10	8 - 8½	8¼
4,669	10	Do. 6 do. 2nd do.	10	6½- 7	
		TELEPHONES.			
154,165	1	Con. Telephone & Maintenance, Ld. Nos. 1 to 154,165	1	1¼- 1½	1 7/16.⅜ xd.
200,000	1	Oriental Telephone Co., Nos. 100,000 to 300,000	½	⅜- ⅝	⅜.½.
100,000	5	United Telephone Co.	5	11¼-11¾	10¾.11⅝.¼.½.⅝ .11/16.⅜.⅞.12.1/16 .11½.12

TRAFFIC RECEIPTS.

West Coast of America Telegraph Company. The gross earnings, traffics and steamer, for the month ending June 30th, 1882, were £3,425, against £3,405 in the corresponding period of last year.

Western and Brazilian Telegraph Company, Limited. The traffic receipts for the week ending July 7th were £1,719, after deducting the "fifth" of the gross receipts payable to the London Platino-Brazilian Telegraph Company, Limited.

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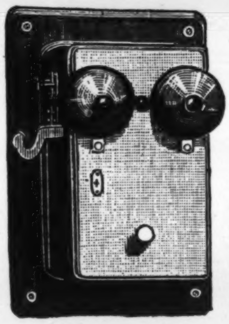

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G.	,,	Australia, New Zealand, Figi, &c.	26
K.	,,	the West Coast of Africa, Madeira, &c.	12
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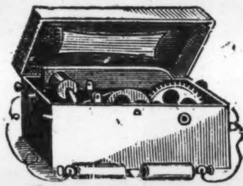

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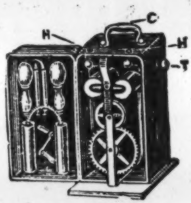

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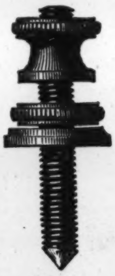
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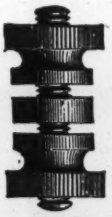
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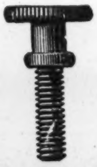
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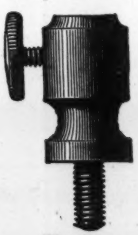
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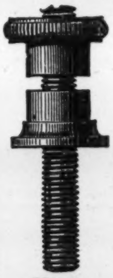
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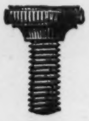
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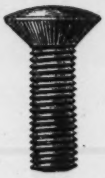
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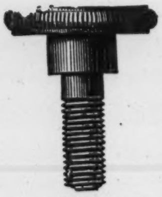
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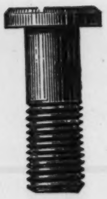
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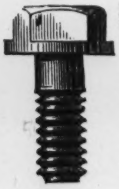
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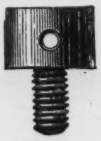
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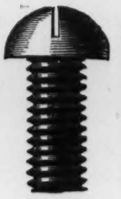
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